

# FLIGHT

The  
AIRCRAFT ENGINEER  
AND AIRSHIPS

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## CONTENTS

	PAGE
Editorial Comment:	
Pessimists Confounded	525
Packard Diesel Engine	527
Air League	532
Croydon Notes	533
Airisms from the Four Winds	534
H.M.S. "Glorious"	535
Shell-Mex and the Cape Flight	543
Private Flying and Club News	544
Air Transport	549
Royal Air Force	551
Civil Aviation Subsidies	551

## DIARY OF CURRENT AND FORTHCOMING EVENTS

Club Secretaries and others desirous of announcing the dates of important fixtures are invited to send particulars for inclusion in this list—

1930

May 17	Flying Display and Opening of Brooklands Aero Club.
May 31	Official Opening and Air Pageant, Bristol Airport.
June 1	Ashwell-Cooke Challenge Cup, Lympe.
June 7	N.F.S. Air Meeting, Reading.
June 9	Northampton Flying Meeting.
June 12	Isle of Wight Flying Club Meeting, Shanklin.
June 13	N.F.S. Air Meeting, Nottingham.
June 14	Manston Garden Party.
June 21	Household Brigade Flying Club Meeting at Heston.
June 21	Air Rallye at Haldon Aerodrome, Teignmouth.
June 26	Ipswich Air Pageant.
June 27	R.A.F. Dinner Club Annual Dinner.
June 28	Royal Air Force Display, Hendon.
July 5	King's Cup Race and Hanworth Air Pageant.
July 19	N.F.S. Flying Meeting, Leeds.
July 19	N.F.S. Flying Meeting, Hull.
July 20-Aug. 7	International Light 'Plane Tour of Europe, starting from Berlin.
July 26	Norwich Flying Meeting.
July 31	Entries close for 1931 Schneider Trophy Contest.
Sept. 1-6	5th International Air Congress at The Hague.
Sept. 6-28	Aero Exhibition, Stockholm, Sweden.
Sept. 20	Liverpool Air Pageant.
Sept. 27	N.F.S. Air Meeting, Hanworth.
Nov. 28-	
Dec. 14	Paris Aero Show.
Dec. 31	Closing Date for the Aga Khan's Prize for Indian Flight.

## EDITORIAL COMMENT



HERE are occasions when the best way to produce results is to prod a slacker with vigour, and to rub into him the number and magnitude of the things which he has left undone which he ought to have done. Provided that the said slacker is capable of feeling shame, and also that he is really culpable, he may begin to bestir himself, and, in colloquial parlance, to get a move on. But if the accused has in reality done quite a lot of what he is accused of neglecting, the lesson loses point and is apt to recoil on the head of the accuser.

### Pessimists Confounded

It is a common way with the British to depreciate their own achievements when compared with those of other nations. This is sometimes called an amiable weakness. On the whole, it may not do much harm. But often it means that one set of Britons abuses another set of Britons because the latter, having achieved a certain amount of success, have forborne to blow their own trumpets. Then the weakness of the critics is not so amiable.

A case in point is the popular impression of British backwardness in the matter of aerial transport. It has been stated very often that we have lagged far behind Germany, France, and the United States. The statement has been repeated so often that it has come to be generally believed. In a debate in the House of Commons on May 5, Lieut.-Commander Kenworthy stated that it was a "woeful fact" that we were still only the sixth or seventh nation in civil flying. Doubtless he was thinking only of the United Kingdom, which is a foolish thing to do. Fortunately, the Under-Secretary for Air, Mr. Montague, was ready for him, and rightly substituted an Imperial basis of comparison. The figures which he was able to quote were quite surprising to the House, and must have taken the pessimists' breath away. The idea (and the fact) that British effort should rank second in the world must have quite

spoilt their appetites for dinner that evening. The figures which Mr. Montague gave were as follows :—

	Miles.
United States ... ..	46,622
British Empire ... ..	20,850
France ... ..	17,500
Germany ... ..	16,500
Italy ... ..	7,803

The British figures are made up as follows. Including the service from Croydon to Karachi, the United Kingdom is responsible for 5,305 miles. This figure will shortly be increased by some 8,000 miles when the service from Croydon to Capetown is opened. Australia at present provides 6,937 miles. It is possible that this figure may shortly be reduced by 1,000, as the Commonwealth Government has decided not to renew the subsidy to the Larkin Aircraft Supply Co., Ltd., for the services Adelaide-Cootamundra (578), Melbourne-Hay (189), Mildura-Broken Hill (233), and it seems unlikely that the firm will be able to continue operations without such help. On the other hand, a service between Melbourne and Tasmania is about to start, while the late Government sanctioned a scheme for inaugurating services Sydney-Brisbane and Camooweal-Darwin, which will probably start in due course. It should be noted that the Australian figures include a very active service, 80 miles long, in New Guinea.

Canada provides 6,453 air miles. The speed with which aerial transport has gone ahead in Canada in the last couple of years is really bewildering. South Africa, with only one company operating, is able to contribute the respectable figure of 1,440 miles. India at the moment has only one air service, the State airway between Karachi and Delhi, which is 715 miles in length. But the Indian Government has decided to extend this to Calcutta (making a total of 1,400) in the near future, and then on to Rangoon. The persistent demands for a branch line Karachi-Bombay cannot long remain disregarded, and the

next logical step must be a Bombay-Madras service. India should soon have a more than respectable air mileage.

Rangoon and Darwin cannot remain indefinitely without an air link, nor can Sydney and Wellington. The India-Australia airway is already the subject of negotiations between the Governments of Great Britain and Australia. Next, we must not forget the possibilities of airship services. The most obvious airship route is Cardington-Montreal, and its possibilities are to be explored in a preliminary manner during this month by R 100. Altogether, despite the probable set-back in the matter of the Larkin lines, the British Empire air mileage is not only creditable at the moment, but has reached a stage where rapid extension on a generous scale in all directions has become imminent.

We may frankly admit that the start has been slow. But that, when one considers the circumstances, is only natural. Air transport has only proved really useful when the distances are great, which is much the same as saying (in Mr. Montague's words) in Imperial conditions. The French air mileage is due to the proximity of France's Empire in northern Africa. Though Germany is a republic in name, it is in composition as much an Empire as when the King of Prussia wore the Imperial crown. In fact, the modern meaning of the word "Empire" is "united states," and it follows from that that the United States of America is also an Empire. In France, in Germany, and in the U.S.A., the States which compose the Empire are contiguous, or are only divided by an inland sea. In the British Empire the component States are scattered about the world, and are divided by continents and oceans. It was only natural that the compact Empires should be the first to use aircraft to connect their States. For the British Empire the task was more difficult, and depended largely on the evolution of long-range aircraft. We have still some distance to go in developing the flying-boat, and we still do not know if the airship will serve our purpose. But for pessimism there is not the least excuse.



"PUSS IN BOOTS": The De Havilland "Puss Moth" (Moth Three) with inverted "Gipsy III" engine, has now been put on floats. Last week one of these machines was flown from Rochester to the Welsh Harp by Capt. Broad. The floats have been made by Short Brothers. (Flight Photo.)



# THE PACKARD DIESEL ENGINE

(The following article appeared in the April, 1930, issue of our American contemporary "Aero Digest," of New York, to which we are indebted also for the illustrations which accompany the article. It is with extreme regret that we learn, since preparing the article for publication, of the untimely death in an air accident of its author, Capt. L. M. Woolson, who was the designer of the Packard compression-ignition engine.—ED.)

**T**HE Packard Diesel aircraft engine is of the radial air-cooled type having nine cylinders with a bore of 4.812 in. and a stroke of 6 in., giving a displacement of approximately 980 cu. in. The engine is rated at 225-h.p. at 1,900 r.p.m., and weighs 510 lb. or 2.26 lb. per rated horsepower.

The outside diameter of the engine is slightly over 45 in., and the engine is attached to the mounting ring with eight  $\frac{3}{4}$ -in. bolts arranged on a bolt circle of 22 in. diameter. So far as its general characteristics are concerned with relation to size, weight and general arrangement, the engine does not differ radically from conventional gasoline aircraft engines of a similar type. This comparison, however, holds good only in so far as general external appearance is concerned, since the engine incorporates many constructional features never before employed in aircraft engines.

## The Diesel Principle

Since the new Packard engine operates on an entirely different principle than the gasoline engines used heretofore in aircraft, it is desirable before launching into a mechanical description of the engine to consider first in a general way the principles of operation of the Diesel cycle as opposed to the Otto cycle principle on which nearly all gasoline engines operate.

The real point of departure between the two systems of operation is the ignition system involved. In the gasoline engine an electric spark is depended upon to fire a combustible mixture of gasoline vapour and air, which mixture ratio must be maintained within fairly narrow limits in order to be fired by this method.

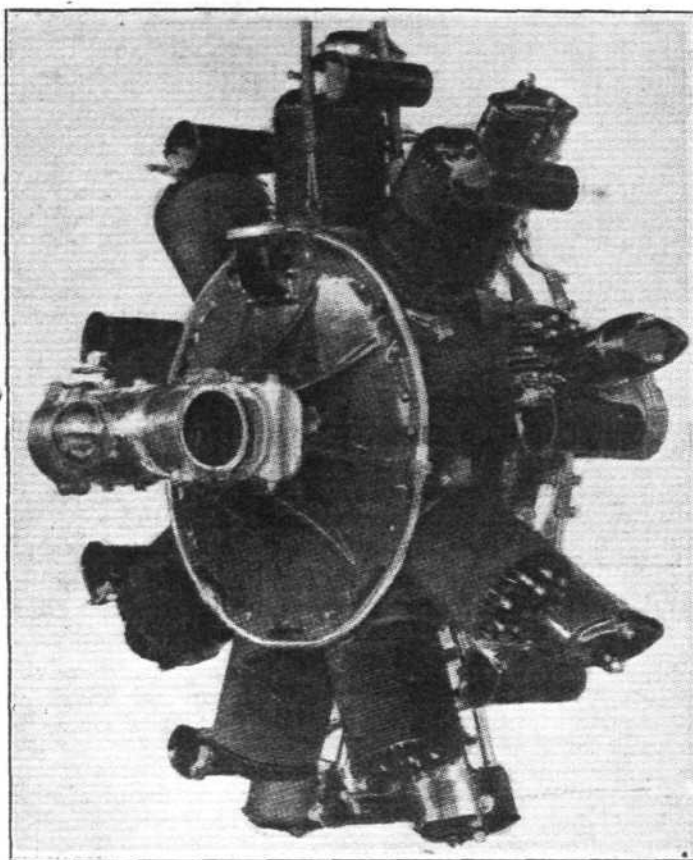
In the Diesel engine, pure air is introduced into the cylinders instead of a mixture of air and fuel as in the gasoline engine, and this air is compressed into smaller space than is possible using a mixture of gasoline and air which would spontaneously and prematurely detonate if compressed to this degree. The temperature of the air in the cylinder at the end of the compression stroke of a Diesel engine operating with a compression ratio of about 16:1 is approximately 1,000° F., which is far above the spontaneous ignition temperature of the fuel used. Accordingly, when the fuel is injected in a highly atomised condition at some time previous to the piston's reaching the end of its stroke, the fuel burns as it comes in contact with the highly heated air and the greatly increased pressures resulting from the tremendous increase in temperature brought about by this combustion, acting on the piston, drive the engine as in the case of the gasoline engine.

Summing up, then, the differences between the Diesel and gasoline engines, start with the fact that the gasoline engine requires an electrical ignition system in order to fire the combustible mixture, whereas the Diesel engine generates its own heat to start combustion by means of highly compressed air. This brings about the necessity for injecting the fuel in a well atomised condition at the time that combustion is desired, and the quantities of fuel injected at this time control the amount of heat generated; that is to say, an infinitesimally small amount of fuel will be burned just as efficiently in the Diesel engine as a full charge of fuel, whereas in the gasoline engine the mixture ratio must be kept reasonably constant, and if the supply of fuel is to be cut down for throttling purposes the supply of air must be correspondingly reduced. It is this requirement in a gasoline engine that necessitates an accurate and sensitive fuel and air metering device known as the carburettor.

The fact that the air supply of a Diesel engine is compressed and its temperature raised to such a high degree permits the use of liquid fuels with a high ignition temperature, and it is these fuels which correspond more nearly to the crude petroleum oil as it issues from the wells. This fact accounts for the low cost of the Diesel fuel.

## General Design Features

A review of the design will show that weight economies have been secured by a simplification of design.

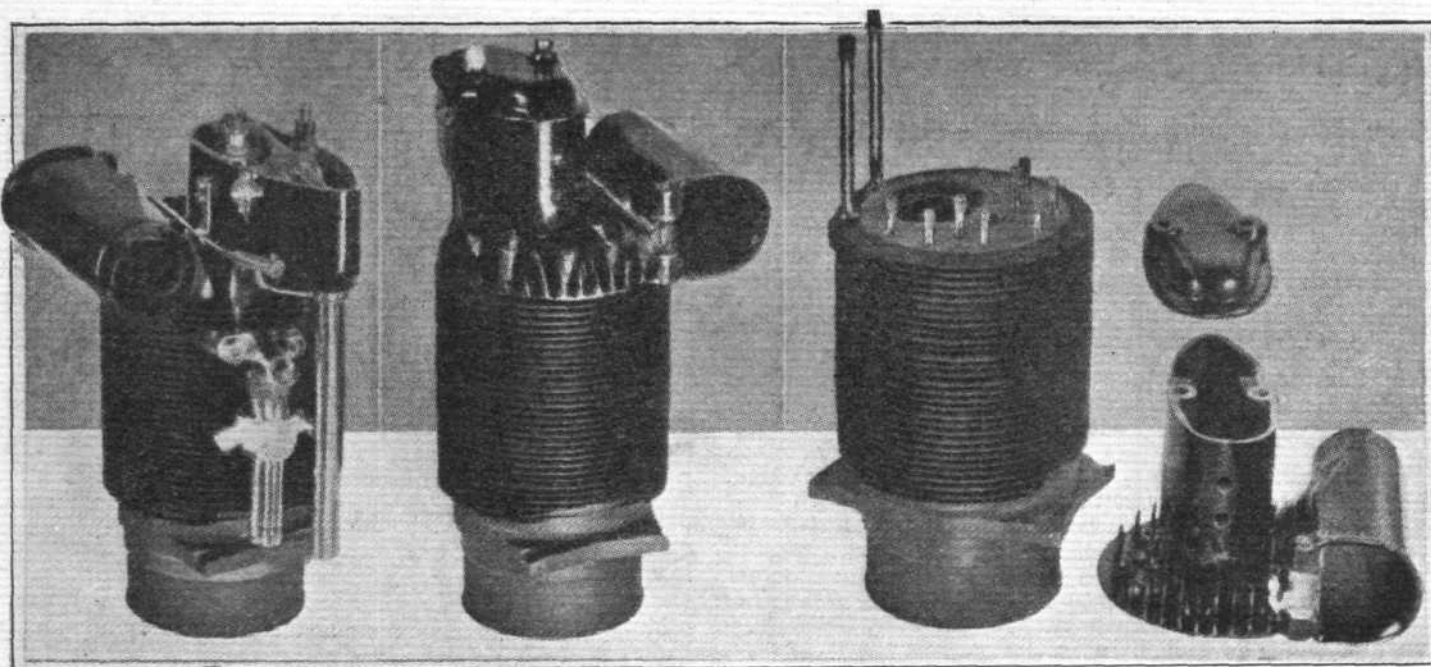


Three-quarter front view of Packard Diesel.

The crankcase, which weighs only 34 lb., is unique not only because it is of one piece, thus dispensing with heavy flanges and bolts, but also because of the novel fashion in which the cylinders are fastened to the crankcase. Two circular hoops of alloy steel encircle the cylinder flanges in contact with the crankcase at the front and rear of the engine, and these hoops are contracted by means of turnbuckles so that an initial stress is set up in these hoops which exceeds by a wide margin the operating stress resulting from the cylinder explosions. When the engine is running these stresses are materially reduced and at no time is it possible to transfer any tension loads from the cylinder to the crankcase.

In the Packard Diesel engine, the maximum cylinder pressures are more than ten times greater than the average cylinder pressures during the working stroke and this would necessitate the pistons, connecting rods, crankshaft and propeller being approximately ten times as strong as they would have to be to resist the average pressure, were it not for the fact that effective measures have been taken to cushion these major parts of the engine from the shock-loading resulting from the high explosion pressures. Advantage is taken of the fact that these peak explosion pressures exist for a very short time in each cycle. The crankshaft counterweights and the propeller are both flexibly mounted on the crankshaft so that when the peak pressures occur a cushion is interposed between the crankshaft and those parts which have the maximum inertia or flywheel effect. In this manner, the stresses in the crankshaft are reduced and it is possible to use a crankshaft of a size not substantially different from that employed in a corresponding gasoline engine of the conventional type.

To describe the cushioning methods in detail—the counterweights, instead of being rigidly bolted to the crank cheeks, are pivoted on them and are located between powerful compression springs. With this arrangement when the crankshaft is suddenly accelerated, the counterweights lag behind slightly so that the peak cylinder pressure is expended before the counterweights are again solidly driven by the crankshaft. In a similar fashion, the propeller hub, instead of being splined or keyed to the crankshaft, is allowed to float on an extension of the crankshaft driving-end, and specially designed propeller-blade clamp-rings provided with integral driving lugs receive the driving effort from a two-armed driving member splined to the crankshaft. On the extremity



Rear and front views of Packard Diesel cylinder units and their sub-assemblies.

of each of these two arms, a pair of rubber blocks are compressed, between which the propeller clamp ring driving lug is secured. These rubber blocks are confined in such a manner as to yield the desired elasticity.

Before giving a detailed description of the engine it might be desirable to discuss briefly the special features of the cylinder design which have resulted in a very light construction, each cylinder weighing only 11½ lb. The cooling problem of a Diesel cylinder was considerably simpler than that of a corresponding gasoline engine cylinder, since the increased thermal efficiency of the Diesel is reflected in lower heat losses to the cylinder walls than is the case with the gasoline engine cylinder. This fact justified a simple form of closed end cylinder design in which the cylinder head proper is formed integral with the cylinder barrel.

The fact that only pure air is drawn into the cylinder on the intake stroke of the Diesel permits the use of a single valve for both inlet and exhaust purposes. Bolted to the top of each cylinder is a light aluminium cylinder head carrying cooling fins and supporting the valve operating mechanism as well as forming the combined inlet and exhaust port.

One of the main distinctions between a Diesel engine and a gasoline engine is the manner of insuring a homogeneous mixture of fuel and air. It is obvious that in either case

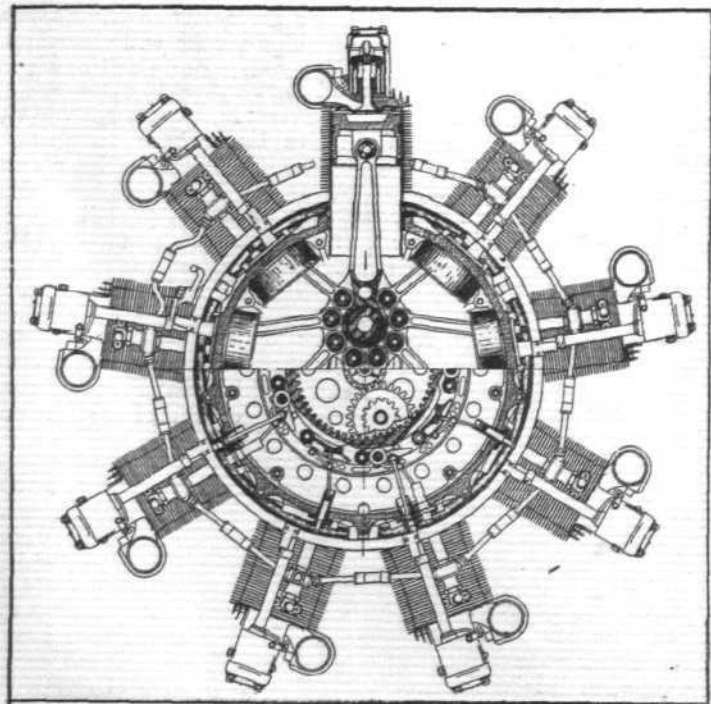
such a mixture must be created if perfect combustion is to be secured in the extremely short space of time available, amounting to about four-thousandths of a second at an engine speed of 1,800 r.p.m.

In a gasoline engine this mixing of fuel and air is accomplished in the carburettor, intake manifold, rotary distributor (if used) and finally, in the cylinder itself during the intake and compression stroke. In the Diesel engine no fuel is admitted into the cylinder until practically the instant that combustion is desired. It is obvious, therefore, that in a high-speed Diesel special means must be provided to insure efficient combustion. In the Packard engine this has been accomplished by giving the incoming air an extremely rapid whirling motion. Practically all of the oxygen comes in contact with some part of the fuel spray, thus insuring complete combustion, but such satisfactory results could not be obtained were it not for a finely atomized injection of the fuel, accurately controlled and timed.

The feature which probably contributed most to this phase of operation is the combination fuel pump and nozzle unit. Heretofore, the majority of solid-fuel injection engines of the so-called high speed type (maximum revolutions about 1,200 r.p.m.) have been characterized by a multiple pump unit mounded somewhere on the engine remote from the cylinder heads in which the nozzles are located and connected to them by comparatively long capillary tubing. With such a system satisfactory high-speed operation is difficult to obtain for several reasons, the principal one being that enormous hydraulic pressures necessary for high-speed operation cause serious surges of pressure waves in the tubing which interfere with the correct timing of the fuel injection and also tend to make the engine run unevenly, since it is difficult to arrange the tubing to the various cylinders all of the same length. Another difficulty arises from the trapping of air in the capillary tubing, which air is difficult to expel and causes the engine to misfire. These troubles have been overcome with the Packard fuel injection system since the pump and nozzle are practically one unit with short connecting passages between them.

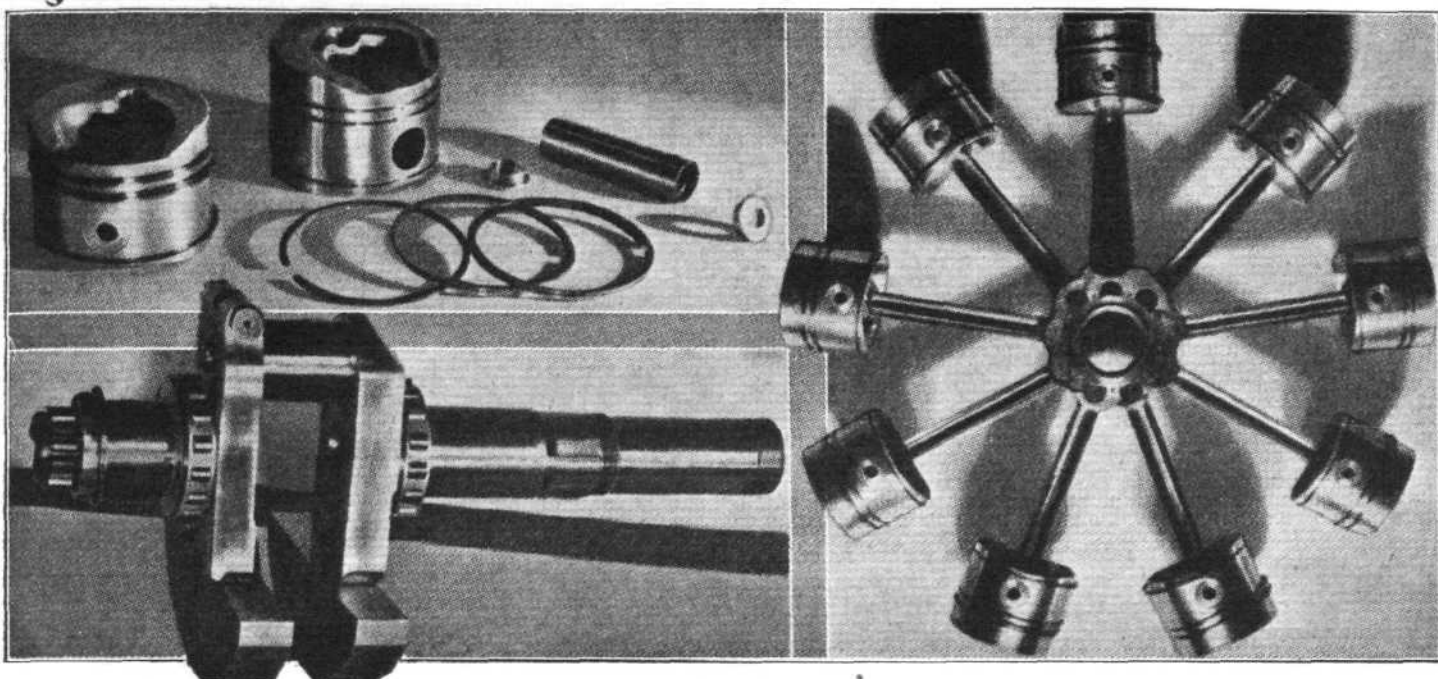
The crankcase of the Packard Diesel is a one-piece magnesium alloy casting of rather large diameter, this casting supporting, through the medium of a forged steel container, a deep groove ball bearing at the front end adapted to take both propeller thrust and radial load at this point. A roller bearing is mounted immediately ahead of the front crankshaft cheek, this bearing arrangement being quite orthodox.

The crankshaft is of the commonly used split type, the rear half of the crankshaft being attached to the front half by means of a clamp bolt and key engaging the crankpin. The rear crankshaft bearing is also of the roller bearing type and is supported in a removable wall in the crankcase termed the diaphragm. This diaphragm is immediately in line with the rear cylinder retaining hoop just as the front crankcase integral wall is immediately in line with the front cylinder retaining hoop. In this manner, these two walls receive the full compression of the retaining hoops, a close fit being



Transverse section of the Packard Diesel engine.  
Rear view.





Pistons, crankshaft unit and connecting rod assembly of Packard Diesel.

maintained between the outside diameter of the diaphragm and the bored opening in the crankcase.

The rear end of the crankcase is closed by a cover casting which carries the oil and fuel circulating pumps, starter, generator and tachometer drives.

The connecting rod assembly follows standard practice in practically every respect, a master connecting rod being used in conjunction with eight link connecting rods of conventional design.

The valve and fuel pump push rods, of which there are nine each, all radially arranged at the rear of the engine, are in turn operated by two cams which are formed integrally and each of which is provided with four lobes. These cams are driven at one-eighth engine speed in the direction opposite to the crankshaft rotation, a large internal gear being formed integrally with the cams and a compound idler gear meshing with the cam and crankshaft gears respectively. Both the single valve and fuel pump of each cylinder are operated through the medium of rocker arms which contact with the respective cams and are supported on a common shaft, which is anchored in the diaphragm and also obtains a steady bearing in suitable bosses formed in the cover casting. The pair of rocker arms for each cylinder is located endwise between an integral shoulder on the shaft at the inner end and a shouldered bushing held in place by a cap screw at the outer end. Both the fuel pump and valve rocker arms contact with short ball-ended push rods, the outer ends of which contact with plungers fitted in forged duralumin guides, which are radially arranged and bolted to finished surfaces on the outside of the crankcase.

Whereas the inner end of the air valve push rod seats in a spherical receptacle formed in the rocker arm referred to, the inner end of the fuel pump operating push rod fits in a specially formed groove or channel provided in the fuel rocker arm. Furthermore, these fuel pump push rods are connected by linkage near their inner ends to a circular control ring mounted in a groove on the diaphragm, the movement of which ring is controlled by an externally mounted lever connected to the pilot's control and offering the sole means of regulating the speed of the engine. The linkage referred to moves the inner end of the fuel push rods in the rocker arm groove, whereas the outer end of the push rod is held in contact with the plunger. In the outer end of the plunger a tappet screw with lock nut is fitted, this tappet contacting directly with the fuel pump operating plunger. It will be understood that the movement of the inner end of the push rod alters the effective stroke of the fuel pump plunger, thus varying the amount of fuel injected into the cylinders in accordance with requirements.

The lubricating oil pump is mounted on the crankcase cover and driven by a spur gear off of the cam idler gear.

The crankcase cover is provided with additional flanges conforming to standard S.A.E. generator, engine starter and fuel pump mountings, and a standard form of tachometer drive is provided.

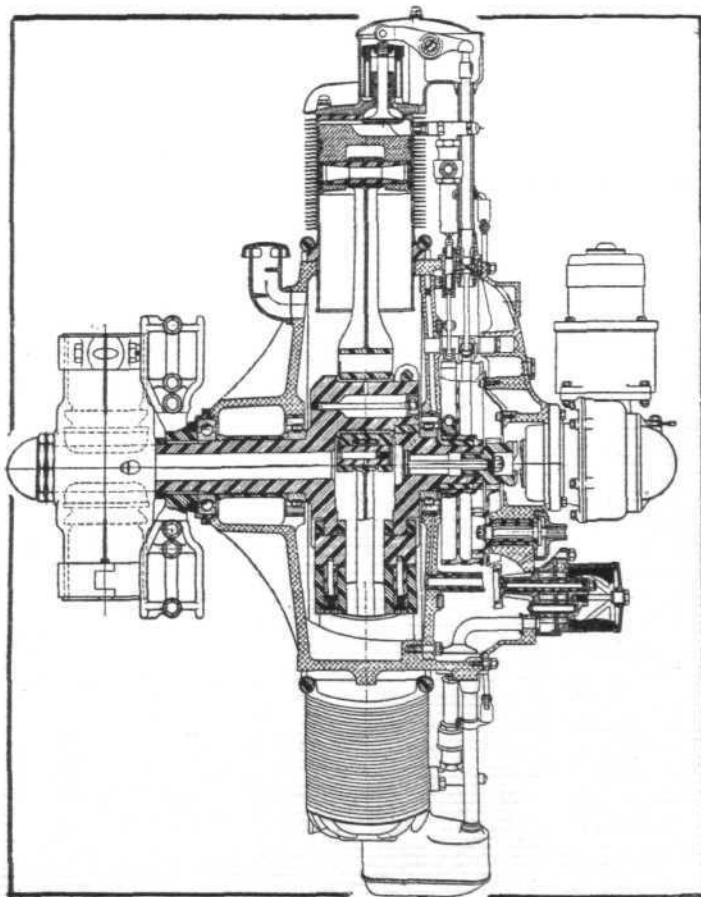
The cylinder heads are light aluminium alloy castings which serve merely to support the overhead valve mechanism

and valve stem guide and incorporate the inlet and exhaust ports.

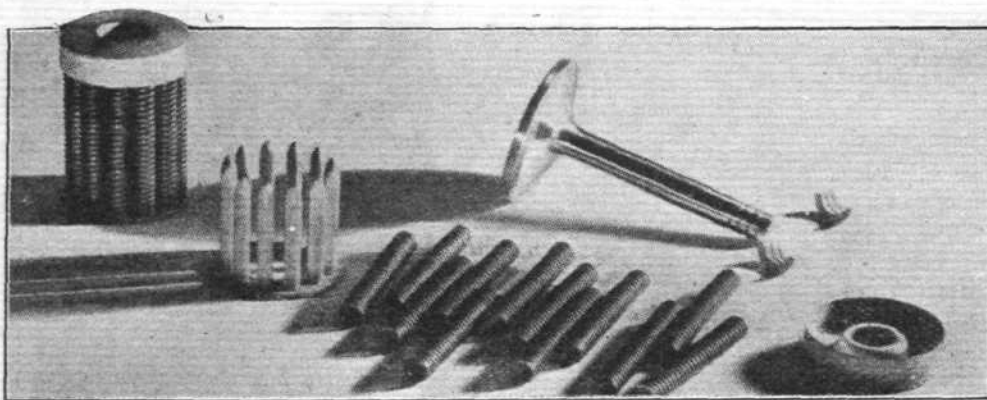
The valve operating mechanism outside of the crankcase consists of a ball-end push rod engaging a rocker arm of conventional design, which is mounted on a roller bearing, which in turn oscillates on an eccentrically arranged shaft. This shaft is supported in bosses on the cylinder head and is locked in place by a castellated nut.

Each valve is fitted with twelve valve springs of the multiple type used on previous models of Packard aircraft engines, and as an additional precaution, a small wire circlip engages the valve stem above the valve guide and prevents the valve from dropping into the cylinder from any cause.

An aluminium alloy piston is used characterised by a peculiarly shaped head provided with an eccentrically located pocket, which is designed to promote, in conjunction with the inlet port and valve arrangement, a high degree of turbulence



Longitudinal section of Packard Diesel.



Valve springs, guides and caps used on Packard Diesel.

which is so largely responsible for the efficient operation of this engine at high speed.

A piston pin of conventional construction is used and it is allowed to float in both the piston bosses and the connecting rod small end bearing. Aluminium plugs are expanded into each end of the piston pin.

The fuel pump and nozzle assembly constitutes a readily detachable and interchangeable unit which is bolted to a flange on the rear of the cylinder by means of two cap screws. Fuel at low pressure is supplied to the screen housing and the pump plunger is operated by the adjustable tappet referred to previously. Aside from these external connections the entire pump and nozzle represents a self-contained unit.

The fuel pump body consists of an alloy steel forging machined all over and fitted with a bronze cylinder, which is pressed in place, after which the cylinder bore is finished by special equipment and methods which have been developed to secure the extreme accuracy and high finish which are essential to this cylinder bore. The pump plunger is formed of heat-treated steel and provided with a mushroom head, which engages a T-slot in a cross head or guide, which contacts in turn with the fuel pump tappet. A compression spring surrounds the fuel pump cylinder and returns the pump plunger at the conclusion of its working stroke. Ports are provided in the fuel pump cylinder through which the fuel enters after passing through a fine mesh screen of such generous area that cleaning is not required for several hundred hours of operation. Clamped between the fuel pump body and the nozzle body is a ball check valve assembly, which permits the fuel to flow to the nozzle and prevents any gases from the combustion chamber backing up into the fuel pump cylinder.

The nozzle body is formed with an integral two-bolt flange which constitutes the means of attachment to the engine cylinder. The nozzle assembly itself is an independent unit, which is screwed into the nozzle body and consists of a flared end nozzle, into which is seated a small poppet valve fitted with a compression spring arranged to hold the valve seated, not against the nozzle, but against an independent adjustable screw stop situated at the rear end of the nozzle body. This nozzle valve is adjusted to be off of its seat a few thousandths of an inch, an arrangement which insures atomization for starting and freedom from carbon-forming propensities.

Each cylinder head is provided with a shutter valve operated for a fore and aft connecting rod which, in turn is connected by a ball joint to the air valve push rod tube. These tubes are fitted with ball-jointed levers at their inner ends engaging sockets which are riveted to a control ring supported from the crankcase mounting bosses. This control ring is operated by means of a cam in conjunction with the throttle so that for idling purposes the front ports of the cylinder head are substantially closed and all air is drawn back through the exhaust manifold.

Though this system is not essential to the operation of the engine, it has been found that better idling is secured in this fashion, it being possible to run the engine steadily at speeds as low as 250 r.p.m.

One of the major problems in connection with the development of this Diesel aircraft engine has been the matter of starting. It was finally concluded that the conventional type of inertia starter used so successfully with gasoline aircraft engines offered the best solution.

It was found necessary to develop an incandescent heating element or glow plug to give the required heat. These glow plugs are not required except at low temperatures, but their presence in the engine offers no handicap to its ordinary

operation and these plugs will therefore normally be fitted to the engine, although in special cases they may be omitted and their place taken by blind plugs. With these glow plugs instantaneous starts are possible at any temperature at which it is possible to turn the engine over at all.

In general, the lubrication system does not differ radically from conventional practice. There are no oil pipes inside the engine nor are there any drilled passages in the crankcase itself. The system operates on the dry sump principle with an external oil tank in close proximity to the engine. A pipe leads from the bottom of this tank

to a connection on the oil pump housing, whence it flows through a generous size screen which is readily accessible for cleaning purposes. The oil then enters the pressure pump, and from there it is forced through the main connection to the engine, with a pressure relief valve adjusted to about 60 lb. per sq. in. returning the excess oil to the tank.

The rear crankshaft cheek is drilled in line with a hole in the crankpin communicating with the interior thereof, which is bored out for lightness and to act as an oil reservoir. A hole is drilled in the crankpin for lubricating the connecting rod bearing, which is formed of two flanged bushings mounted end to end with a small space between them. Oil flows through this space into slots machined in the master connecting rod big end bore and thence through small holes drilled at an angle to bring oil under pressure to the link rod pin bushings.

Both crank cheeks are also drilled to provide oil passages to the counterweight pin bushings.

Returning now to a consideration of the diaphragm oil passages—the main radial feed hole which supplies oil to the oil ring referred to is extended to meet a groove surrounding the rear roller bearing liner. This circular groove distributes oil through eight other radially drilled passages to each of the hollow rocker arm shafts. These shafts in turn are drilled radially with small holes to provide pressure lubrication for both the fuel and valve rocker arms.

### Operation of the Engine

The operation of the engine is as follows.

Starting with a consideration of the intake stroke—it will be found that the single valve has been open during the exhaust stroke and remains open as the piston travels down from top dead centre, drawing fresh air through the intake port which is exposed to the slipstream of the propeller. Shortly after bottom dead centre the valve closes and the air in the cylinder is compressed on the up-stroke of the piston. A compression ratio of about 16:1 being used, the air is compressed to a pressure of about 500 lb. per sq. in. and its temperature is thereby raised to about 1,000° F. About 45 deg. before top dead centre the fuel pump tappet starts to rise, forcing the pump plunger upward. As soon as the pump plunger has passed the inlet port of the fuel pump, the fuel which is trapped in the fuel pump cylinder is compressed and forced out through the nozzle in a finely atomized spray, which immediately ignites on coming in contact with the superheated air in the cylinder. The amount of fuel injected depends upon the length of the stroke of the fuel pump plunger above the "cut-off" position, that is, the point at which the inlet port to the fuel pump is covered by the plunger. The amount of stroke above this cut-off position is determined by the position of the fuel pump push rod in the groove formed in the fuel pump rocker arm, which depends upon the position of the control ring carrying the small connecting rods which are attached to the push rods. This control ring is rotated through a small arc by means of a tapered roller engaging in a slotted yoke, which is riveted to the control ring. The tapered roller is mounted on a short lever, which is splined to the control shaft, and this shaft is journaled in the crankcase and carries on its outer end a lever also splined to the shaft to which the pilot's throttle control is connected.

As aforesaid, the fuel injection starts about 45 deg. before top dead centre and continues until the piston is almost at top dead centre, thus allowing the pressure to rise in the cylinder at a comparatively slow rate until a maximum pressure of about 1,200 lb. per sq. in. at wide-open throttle is reached. When the piston passes top dead centre the gases expand in the cylinder until the single valve opens approximately 45 deg. before the piston reaches bottom dead centre.



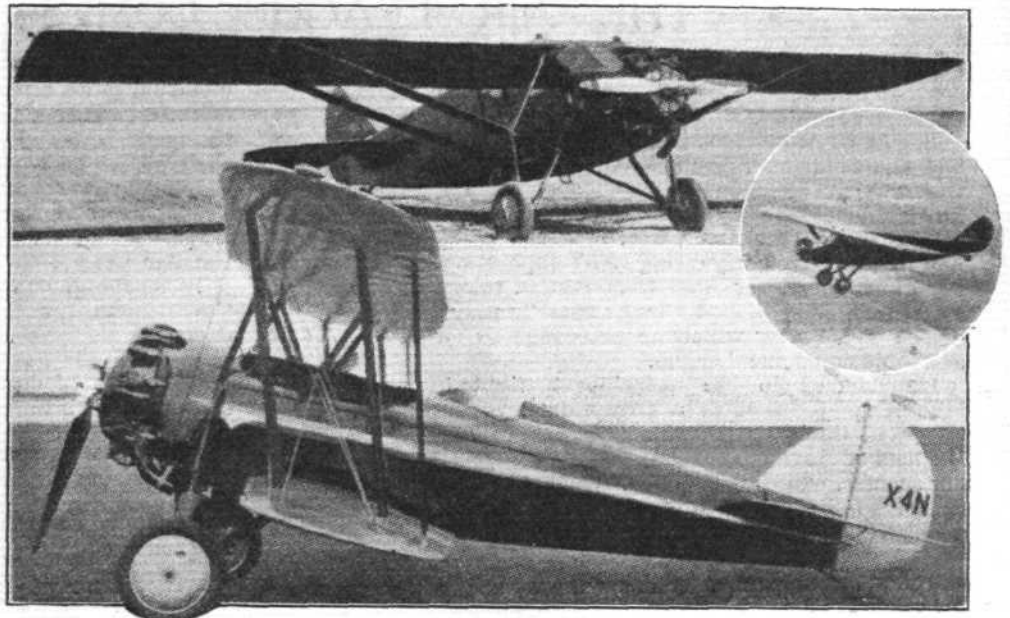
The products of combustion are then forced out through the valve and through the exhaust manifold, which is connected to the rear opening of the combined inlet and exhaust port on the cylinder head. The valve remains open throughout the exhaust stroke and, of course, continues open while the piston is on the intake stroke which immediately follows.

The operation of the engine is exactly the same, regardless of how much fuel is being introduced into the cylinders, except that for very slow idling the fresh air ports are almost closed by the shutters.

The engine is started by means of the familiar type inertia starter used commonly with all types of gasoline aircraft engines.

In stopping the engine it is merely necessary to close the throttle completely against a spring stop, this extra motion of the throttle mechanism serving to restrict the stroke of the fuel pumps until the pump plunger barely rides higher than the pump inlet port and consequently forces no fuel into the nozzle. Incidentally, the engine can be stopped instantly, no matter how hot it may be, since there is never any danger of the engine

kicking backwards. It is therefore never necessary to shut the fuel off when stopping.



Packard Diesel engine installed in Waco and Stinson machines.

## R.A.F. COMMANDS

### Changes in India and Iraq

THE Air Ministry announces the following appointments:

Air Vice-Marshal Sir John Miles Steel, K.B.E., C.B., C.M.G., now Air Officer Commanding, Wessex Bombing Area, Air Defence of Great Britain, to command the Royal Air Force in India at the end of February, 1931, vice Air Marshal Sir William Geoffrey Hanson Salmond, K.C.B., K.C.M.G., D.S.O., on the latter terminating his period of appointment.

Air Vice-Marshal Edgar Rainey Ludlow-Hewitt, C.B., C.M.G., D.S.O., M.C., now Commandant of the Royal Air Force Staff College, to be Air Officer Commanding, Iraq Command, in October next, vice Air Vice-Marshal Sir Robert Brooke-Popham, K.C.B., C.M.G., D.S.O., A.F.C., on the latter terminating his three years' appointment.

Air Commodore Philip Bennet Joubert de La Ferté, C.M.G., D.S.O., now Air Officer commanding, No. 23 Group, Inland Area, to be Commandant of the Royal Air Force Staff College in September next.

The appointment of Air Vice-Marshal Sir John Steel to the command in India is a considerable loss to Air Defences of Great Britain, but a well-deserved advancement for an able and distinguished officer. Under his command, the Wessex Bombing Area has during the last four years displayed efficiency of a very high order. The day-bombing and night-bombing squadrons have aroused the utmost admiration at the Hendon Displays; while during the attacks on London in the air exercises, they filled the citizens with dread. It would have been more logical for the public to rejoice at the efficiency of the bombers, but people persisted in regarding the fighters as their friends and protectors. Anyway, during the exercises of 1928, Sir John Steel made the sensible remark: "There is a lot of nonsense talked about bombing civilians. All the targets which I have ordered my squadrons

to attack are military objectives—targets which the artillery would shell if they could reach them. Otherwise, my pilots if captured would be liable to be treated as war criminals." Sir John was in the Navy in the early years of the war, and reached the rank of captain, R.N., in 1916. From February, 1917, to the end of the war he commanded the R.N.A.S. (later R.A.F.) station at Eastchurch. After the war he put in some years at the Air Ministry, and was Director of Operations and Intelligence, Deputy Chief of the Air Staff, and additional member of the Air Council. In January, 1925, he was promoted Air Vice-Marshal and placed in command of the Wessex Bombing Area. His experience should eminently fit him for the command in India.

Air Vice-Marshal Ludlow-Hewitt was in the Royal Irish Rifles when war broke out, and at once joined the Royal Flying Corps. He went to France in March, 1915, and served there, with intervals at home, until the end of the war. He was then employed at the Air Ministry for several years. Since May, 1926, he has been Commandant of the Staff College at Andover. He was promoted Air Vice-Marshal at the beginning of the present year. As A.O.C. in Iraq, he will hold one of the most responsible posts open to an officer of the Royal Air Force.

Air Commodore Joubert de la Ferté learned to fly in 1912, and received certificate No. 280 from the Royal Aero Club on September 3, of that year. He was then in the Royal Artillery, but next year he joined the R.F.C. During the war he served in France, Egypt, and Italy, and commanded the R.A.F. in Italy, where our squadrons completely drove the Austrian machines out of the air. Since the Armistice he has served at the Air Ministry, at the Staff College at Andover, and at the Imperial Defence College. Lately he has commanded No. 23 Group, Inland Area.

### Aircraft Names

A NEW system of giving names to R.A.F. aircraft is being brought into use. Hitherto the initial letter of the name has been the same as the initial of the constructing firm, e.g., Avro "Avenger." As a number of machines were designed each year which never reached the production stage, the supply of possible names was gradually becoming exhausted. Under the new system, a type will be known by letters and figures unless and until it is accepted as standard

service equipment. Only types so accepted will receive names, and then the initial letter of the name will indicate the class to which the machine belongs. Thus, all names beginning with F (e.g., Ferocious) will indicate a single-seater land fighter. The names of fleet fighters will begin with N, troop-carriers with C, multi-engined bombers with B, single-engined bombers with P, and Army co-operation machines with A. The complete list of initials has not yet been compiled.

## THE AIR LEAGUE COMES OF AGE

THE Air League celebrated their twenty-first birthday by a dinner and dance at the May Fair Hotel on Wednesday, May 7.

SIR ALAN ANDERSON, the Vice-President of the Air League, was the Chairman, and after the toasts to "The King" and the "Other Members of the Royal Family," he spoke on British Aviation and the Air League of the British Empire. Regretting, in the first place, that the Duchess of Bedford had had to leave early owing to an appointment to broadcast her experiences, Sir Alan then read a telegram from Lord Wakefield, who wished the League "many happy returns of the day," after which he proceeded to outline the aims and objects of the League.

He referred to the magnificent flight in progress by Miss Amy Johnson in a Gipsy-Moth to Australia, and a telegram, instigated by the Duchess of Bedford, wishing her success, was drafted.

Twenty-one years ago was a long time, he said, and very vast changes had taken place in aviation since that time. Sir Alan recalled the names of some of the old pioneers, such as Blériot and Rolls, whom he had seen or known, and then he followed up by passing to more modern achievements, such as the Schneider Trophy race last year. Sir Alan, whose interests in the Orient Line should qualify him to speak upon the value of international transport lines, said that we have a good aerial transport service running now, but it was much too small. He said that we fly far fewer miles than other countries, and that we must do all in our power to increase this, and furthermore, the Air League was going to play a very large part in helping this work forward.

Sir Alan then went on to point out that however willing they were to do this work, they could not do so without adequate funds, and he therefore appealed for all to make an effort to increase their membership.

SIR SAMUEL HOARE then supported Sir Alan with a diatribe against the Government policy. A policy, he said, which invariably said "No" to all originality and enterprise. He instanced the fact that the Wright brothers had, in the first place, offered their machine to our Government, who had refused it.

When he was in office his own administration had been off and severely criticised and, in general, he heartily agreed with the criticism, as he would like to have done very much more than he did, but to do so he would have had to have been a Mussolini, and that was not possible at present. When he first went to the Air Ministry, Mr. Bonar Law had asked him whether he would go, and followed up by saying that he was not offering him much as it was possible that before long they would abolish both the Air Ministry and the Royal Air Force! However, this had not come about, and the position today, he thought, was infinitely better than it was in 1922.

Sir Samuel then went on to show how far ahead we were in spite of the critics who said that British aviation was decadent. He was glad to see Col. Moore-Brabazon, who was the first Englishman to fly, when he left the ground in a machine built by Mr. Horace Short. We can, he averred, claim the finest Air Force in the world; our civil aircraft are safer, better, and more reliable than those of any other country; and our civil aviation business was more likely to become self-supporting than that of other countries in the near future. Incidentally, he thought it was a happy chance that at this moment the French Air Minister was flying to the French Colonies in a British machine, namely, the Short Calcutta flying-boat which they have purchased.

Although our R.A.F. is only fourth in numbers, compared with those of other Powers, he said he was certainly among those who believed that it was the finest in the world, and he would never rest until he saw us committed to an agreement which had parity in numbers with the other Powers as its basis.

Our civil aircraft, although they are the safest and most punctual of all other countries, do not fly a sufficient number of miles. He would also like to see airships developed on the great Imperial air routes as he felt that on these routes they would be more efficient and cost less to operate than did heavier-than-air craft. He was glad to see that Lord Trenchard had been raising the question of aircraft and Imperial defence, and he felt that this was a question which the Air League should take up.

In finishing, he would like to make three suggestions to the League for formulating their policy. Firstly, they should press for air parity with the other nations as regards the Royal Air Force; secondly, they should press for the building up of civil aviation so that it was equal in its strength and business to that of other nations; and thirdly, the whole question of the advisability of using aircraft in Imperial defence and thereby economising should be gone into.

COL. MOORE-BRABAZON, in replying, said that tonight they had an exceptional opportunity for seeing the policies of Secretaries of State for Air, both in and out of office, and he hoped that they would all benefit greatly by this unique occasion.

He had been asked, he said, to tell them about his experiences in the early days. The first thing he would like to say was that there was no danger attached to his efforts; in fact, the first time he had really been in danger was when his horse bolted in Hyde Park, and on that occasion he found a

great lack of lateral and directional control! Twenty-one years ago the Secretary of the Royal Aero Club had come down to Eastchurch to see the machine that he was going to fly, and he said, "You are not really going to fly in that thing, are you, Brab?" His reply had been that that was what the machine was intended for, and that the Secretary had gone away tapping his head. This was largely because the Royal Aero Club of those days was chiefly concerned with balloons, and it was not until later that they condescended to turn their patronage to such contraptions as he had then taken off the ground. Now, he said, the Air League has come of age and, though it was flourishing, it must still have more members in order that it might carry out the great work which had always been the reason of its existence.

We undoubtedly make the best aircraft, and we lead the world in the sporting side of aviation, but that is not enough. What the Air League must aim at is to do much the same for aviation as the Navy League has done for the Navy, and what Mr. Pat Hannon did for the Navy League we must hope that he will do for the Air League.

MR. P. HANNON, in supporting Col. Moore-Brabazon, said that they had been associated since the early days, and it was with great pleasure that he supported the toast. Lord Brentford, he said, had started the plea for the Royal Air Force, and it had grown to a fine Service, but the time had now come when it should be developed from an Imperial Defence point of view, and the Air League can help this by educating the public to think of the Royal Air Force as a force for this type of defence. It was up to every member, he said, to get more members, and thereby get support and funds for the League. We as a country must not be behind-hand with our aerial development, and it was the duty of the League to see that we were not. He could not sit down without mentioning the early work done by Charles Bright, whom he thought deserved the very heartiest congratulations.

CAPT. F. E. GUEST then proposed the toast of "Our Guests." He made a most impassioned and sincere speech, in which he deprecated the apathy of the country toward aviation and hoped that the Air League would change this before long. He had, he said, been connected with the Air League for many years, and he heartily agreed with the suggestions of Sir Samuel Hoare, although he was in some doubt about the possibility of parity with other nations.

(Concluded on page 552)



"STRANDED": An aerial view (from Bush House) of the "Spider" which was exhibited all last week in the Strand by Shell Mex, Ltd. (FLIGHT Photo.)



## CROYDON WEEKLY NOTES

**A**S an instance of the extreme value of aviation in international affairs, the flight of Capt. Wilcockson, on G-EBFP, to Catania and back may be quoted.

"Wilky" left Croydon on Thursday, May 1, with the Egyptian delegate, Dr. Abdul Maksud Hammed, for Marseilles; the following morning they flew to Pisa, where owing to shortage of petrol, they were compelled to land with a "pancake and splash" in the flooded aerodrome, thence they winged their way via Rome and Naples to Catania—where they arrived at 6.30 p.m. Dr. Hammed straightway proceeded to Syracuse to meet his colleague.

On Saturday, May 3, at 3.15 p.m., all three set off for Naples, but owing to a strong head wind they had to land at Cipollinia, where—no supplies being available—petrol was sent from Naples by rail.

They started off again on Sunday, May 4, afternoon, landed at Ciserna, and from there via Sarzana flew to Marseilles, where the two delegates decided to separate and take alternative means of travel—the one continuing by aeroplane, and the other travelling by train, boat and train, in case of any delay to the 'plane—which, however, "fetched up" at Croydon at 10.12 a.m., Monday, May 5, several hours ahead of the train, etc., process.

Actually, the double journey by air meant a saving of two or three days over any other method of travel.

Plucky Miss Amy Johnson departed on her long lone flight to Australia at 7.45 a.m. Monday, May 5.

It looked as though her machine was not going to "unstick" at first, but she showed her sound judgment in shutting off and taxiing back to take full run of the aerodrome, and at the second attempt made an excellent take off. I believe all records for this type of flight were broken when she arrived at Karachi, which will confound some of the armchair critics.

"Sammy" Wheeler is back at Croydon again after his second sojourn in the east, where he has been putting up a consistently good record as pilot for Imperial Airways. He tells me that although he cannot vouch for "Pillars of fire by night," he was certainly "led" by "Pillars of dust" by day, which was very discomfoting, having regard to the fact that beer was 5s. per bottle in the desert. Yes, "He wept like anything to see such quantities of sand."

A large depression set in when our old friend F. S. Mockford left the Croydon wireless station to join the Marconi Co.—he had been with us for over ten years and it is due to his brains and energy that our wireless is probably the most efficient in Europe, everybody wishes him the best of luck in his new occupation.

Now that his place has been taken by that cheery soul "Bo" Lane, who has been rustivating at Mitcham in charge of the transmitting station, the depression is filling in.

On Friday, May 9, Capt. Holt departed for Wiesbaden on his three-engined Fokker G-EBZJ, piloted by Mackintosh with Jenkins.

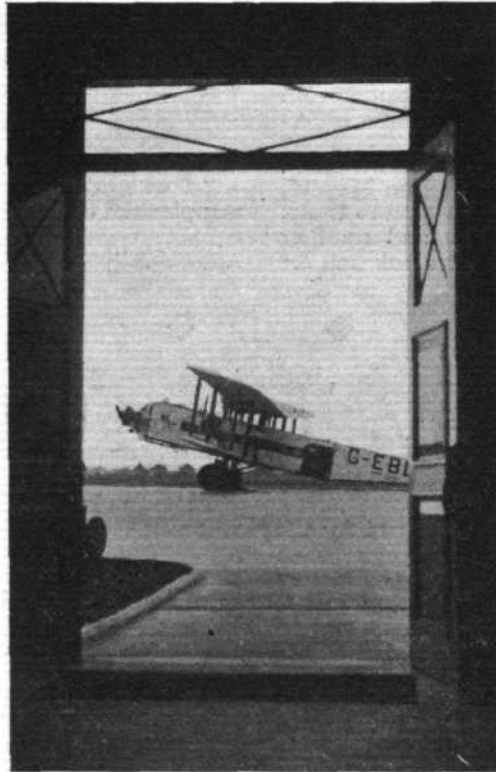
Several candidates are waiting for suitable weather to pass their B licence tests:—Messrs. R. Runtz-Rees and T. K. Morton successfully completed their cross-country flights during the week.

Anybody wishing to see a beautiful piece of construction and upholstery, should carefully examine G-AAWT, Desoutter monoplane, "Hermes" engine, which has just been delivered to the A.D.C. Aircraft Co., for demonstration purposes.

Amongst the distinguished passengers on the Airways this week were:—Lady Louis Mountbatten, Lord Birkett, The French Ambassador, Stribling, and one "Dolly Sister."

Figures for the week May 1 to 7:—passengers, 914; freight, 78 tons.

A certain private pilot, departed one night last week from the Aerodrome Hotel in his car, proceeding townwards; the mist and fog was drifting in thick patches across the road over Mitcham Common, so that he had to come down to lowest gear and proceed at a walking pace, when, lo! he was horrified to observe in front of him what appeared to be two tree trunks "walking" with a red light swinging from side to side from a branch apparently suspended between them. In abject fear he offered up a short prayer, and began to mutter something about "Burnham Wood coming to Dunsinane"—when the fog cleared slightly revealing the "empennage" of an elephant with a red light attached to its tail—the rearguard of Sanger's Circus, which was on the move after their show at Wallington! Where they have been studying their flying "brethren" at Croydon!



**THE GATEWAY TO EUROPE!**  
An Argosy at Croydon ready to depart for Paris



**COMMERCIAL ENTERPRISE:** The Desoutter (Hermes) recently delivered to Cirrus Engines, Ltd. This will enable Mr. V. Holman, sales manager, to keep in better touch with all the firm's customers. Mr. V. Holman, who is an experienced pilot, will fly the machine himself. (FLIGHT Photo.)

## MISS AMY JOHNSON MAKES SPLENDID PROGRESS

**M**ISS AMY JOHNSON, of Hull, who left Croydon on May 5 for Australia, piloting a D.H. "Gipsy Moth," has been making remarkable progress. After six days' flying she reached Karachi and thus was two days' ahead of Bert Hinkler's schedule. From Constantinople, which she reached on May 6, Miss Johnson proceeded the following morning after a delay of several hours owing to a minor trouble. Nevertheless, she managed to reach Aleppo the same evening, after a troublesome crossing of the Taurus Mountains at 8,000 ft.—flying through dense clouds and with the visibility very poor.

On May 8 she accomplished the 470 miles to Baghdad, not without a spice of adventure, having to make a forced landing, on account of bad weather, in the desert. From Baghdad she continued the next day to Bandar Abbas, another 830 miles. Karachi was the next stop, on May 10, having thus made the fastest solo flight from England to India.

Escorted by a Royal Air Force machine and another "Moth," piloted by Wing-Comdr. Crosbie, Miss Johnson set

out next day for Allahabad, a distance of 950 miles. She made a landing *en route* at Jhansi for petrol, and reached Allahabad early in the morning of May 12. After refuelling, she continued her flight to Calcutta, some 460 miles, which was reached in the evening. She thus accomplished nearly 6,000 miles, from England to Calcutta, in eight days, or two days less than Bert Hinkler's time for the similar trip. Miss Johnson left Calcutta on May 13, and made a safe landing at Insein, about 10 miles from Rangoon, as she was unable to locate the latter aerodrome. In taxi-ing, however, the machine ran into a ditch and was slightly damaged, but it was hoped to effect repairs so that Miss Johnson could resume her flight on May 15.

Meanwhile, Lord Thomson, Secretary of State for Air, has sent the following telegram to Miss Amy Johnson:—

"I congratulate you heartily on reaching India by light aeroplane in the record time of 6 days, and trust you will have equal success in the remaining stages of your flight to Australia."



## AIRISMS FROM THE FOUR WINDS

### International Touring Competition

A TOTAL of 74 entries have so far been received for the International Touring Competition, which takes place from July 20 to August 7 next. The course, of approximately 7,500 km., includes controls in Germany, France, England, Spain, Poland, Switzerland and Czecho-Slovakia. The two controls in England will be at the new Municipal Air Port at Bristol, and Heston Air Park. The first entries, which closed on April 15 (late entries being received up to May 15) were as follows:—England, 6; France, 14; Germany, 34; Poland, 16; and Switzerland, 4. The six British entries are the Hon. Lady Bailey, D.H. "Moth" (Gipsy); A. S. Butler, D.H. "Moth" (Gipsy); Cirrus Aero Engines, Ltd., Avro "Avian" (Cirrus "Hermes"); De Havilland Aircraft Co., "Moth" Coupé (Gipsy); Robinson Aircraft Co., Ltd., "Redwing" (Hornet); Simmonds Aircraft, Ltd., Spartan "Arrow" (Gipsy or Hermes).

### A King's Cup Entry?

It is an open secret that the Desoutter Aircraft Co. are preparing a new machine which will be flown by a well-known pilot in the King's Cup Race. This machine will have an inverted Hermes engine in it, and the view has been greatly improved by lowering the side windows either side of the pilot's cockpit. All the windows will be Triplex glass, so that they can easily be opened and cleaned.

### The Aga Khan Prize

THE finish of the "Air race" for the Aga Khan Prize has been somewhat exciting. All three competitors—Mr. Man Mohan Singh, Mr. Aspy Engineer and Mr. G. R. D. Tata—concluded their flights about the same time. The former, who originally set out from Croydon on April 8, and met with several delays en route, arrived at Karachi on May 9. Mr. Engineer, who made comparatively steady progress, arrived the next day, while Mr. Tata (who is a member of the Bombay Flying Club) started from Karachi on May 3, and arrived at Croydon on May 12. At the time of writing it is not yet decided whether the prize of £500 goes to Mr. Man Mohan Singh or to Mr. Engineer.

### A Round-the-World Attempt

MR. JOHN HENRY MEARS, who held the round-the-world in-quickest-time air record until beaten by the *Graf Zeppelin's* flight, has announced his intention of starting next week on an attempt to regain the record. He will be using a Lockheed-Vega monoplane (425 h.p. Pratt and Whitney "Wasp"), and will fly via Harbour Grace (Newfoundland), Valentia (Ireland), Southampton, Berlin, Moscow, Novosilversk, Chita, Knabrovsk, Petropavlovsk, Aleutian Is., Alaska, Seattle, and Roosevelt Field.

### Air Speed Record Attempt

MR. AMHERST VILLIERS has purchased from the Air Ministry one of the Gloster IV biplanes which were used as practice machines by the 1929 High Speed Flight. In this machine will be installed a Napier geared racing engine of the type used in the Schneider Race at Venice in 1927. The engine will not be supercharged. The floats will be removed and a land chassis fitted. A well-known Schneider Trophy

pilot has undertaken to fly this machine and make an attempt to break the world's air speed record. The present record by a landplane is 448.170 k.p.h. (278.5 m.p.h.), established by the late Adjutant Bounet at Istres, on December 11, 1924, in a Ferbois monoplane with 550 h.p. Hispano-Suiza. The highest speed of all was made last September by Squadron-Leader Orlebar in a Supermarine-Rolls Royce S6 seaplane, which achieved 575.700 k.p.h. (357.7 m.p.h.).

### A Pilot's Services Available

A CORRESPONDENT of FLIGHT, a pilot, who has been out of England for the past five years, is anxious to make an air tour of Europe this summer. Being unable to buy a machine himself he would be glad to hear of an owner who would like to have the free services of a pilot and share the expenses of the flight—and also to do such maintenance work as might be necessary. Our correspondent has completed 2,500 hrs. of service flying on most types, and has held the C.F.S. A1 instructors' category since 1925. We will be pleased to put any reader, who may be interested, into touch with our correspondent, if they will communicate with the Editor.

### Desoutter Machines in France

IT is a somewhat remarkable coincidence that two people who were connected with British aviation in the early days should quite recently have met again to arrange for the handling in France of a British light aeroplane. Mr. Lawrence Santoni, in the old days of the British Deperdussin Company, is at present in England in order to arrange with National Flying Services and Mr. Marcel Desoutter for the formation of a company in France to handle the Desoutter monoplane and to operate with it taxi services, etc. For some years Mr. Santoni has been away from aviation, and we are very glad to know that he is coming back, the more so as his return is connected with the work of another Hendon old-timer, Mr. Desoutter.

### "Autogiro" Performance

WE have been asked to point out that in the article on the Autogiro, type C.19, Mark III, published in last week's issue, two minor points should be modified. The first relates to the gliding angle. In a small diagram on p. 503 this was shown as 18 degrees. The diagram was based upon data relating to an older model, supplied to us in error. The actual gliding angle of the new machine has not yet been definitely ascertained, but should be in the neighbourhood of 7 degrees. We are informed that the top speed of the Mark IIa is now 95 m.p.h., and that it is expected to increase this to 100 m.p.h. by "cleaning up" the design.

### A De Havilland Occasion

THE de Havilland Technical School held a dance at the Portman Rooms, in Baker Street, on Friday, May 9. A large number of guests thoroughly enjoyed themselves, and the arrangements, in the capable hands of Mr. Eadon, were well appreciated. Some of the dances were "Spot" dances, and the very acceptable prizes were presented by Lady Bailey to the lucky ones. Capt. de Havilland himself was present as were many other important members of his staff.



# H.M.S. GLORIOUS



**A**IRCRAFT CARRIERS are largely a sealed book to the general public, and since we felt that there was an immense amount in them which should interest all those people who are interested in aircraft, we made arrangements whereby we were able to visit one of our latest aircraft carriers for a few days.

The *Glorious*, the carrier visited, has recently been converted from one of Winston Churchill's "Hush-Hush Light (?) cruisers" into an aircraft carrier. This conversion has taken some six years in all to complete, but that is, of course, mainly due to the varying temperament of our Government, and work has been carried out very spasmodically. H.M.S. *Glorious*, with her sister ship H.M.S. *Courageous*, was laid down in March, 1915; launched in April, 1916, and finally completed in January, 1917. As originally designed she was to be a very fast cruiser armed with big guns, who would rely on her speed for defence rather than on a heavy belt of armour. Her armour is, in fact, a mere 3 in., with an inner screen of about  $\frac{1}{4}$  in. to protect the boilers from fragments.

Her tonnage is 22,700, and she is 786 ft. long with a maximum beam of 81 ft. outside the blisters. These blisters are an addition designed to protect the ship against torpedo attack, and were added to most of our monitors during the war.

She was built by Harland and Wolff, of Belfast, and her rated horse-power is 90,000, which gives her a speed of just over 31 knots. The conversion from cruiser to

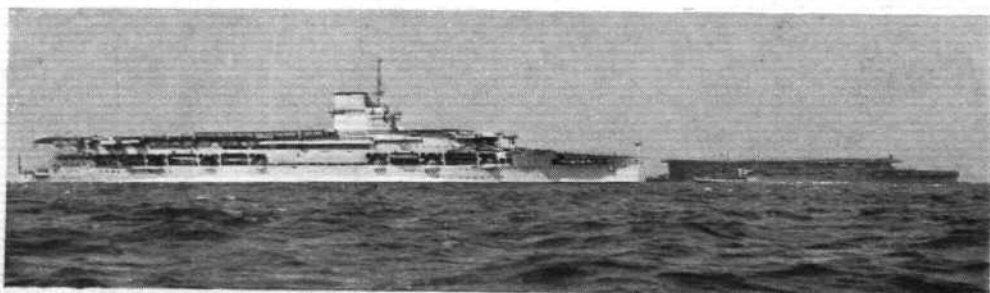
aircraft carrier was originally started at Rosyth Dockyard, but when this yard was closed down she was towed round to Devonport, where the work was completed.

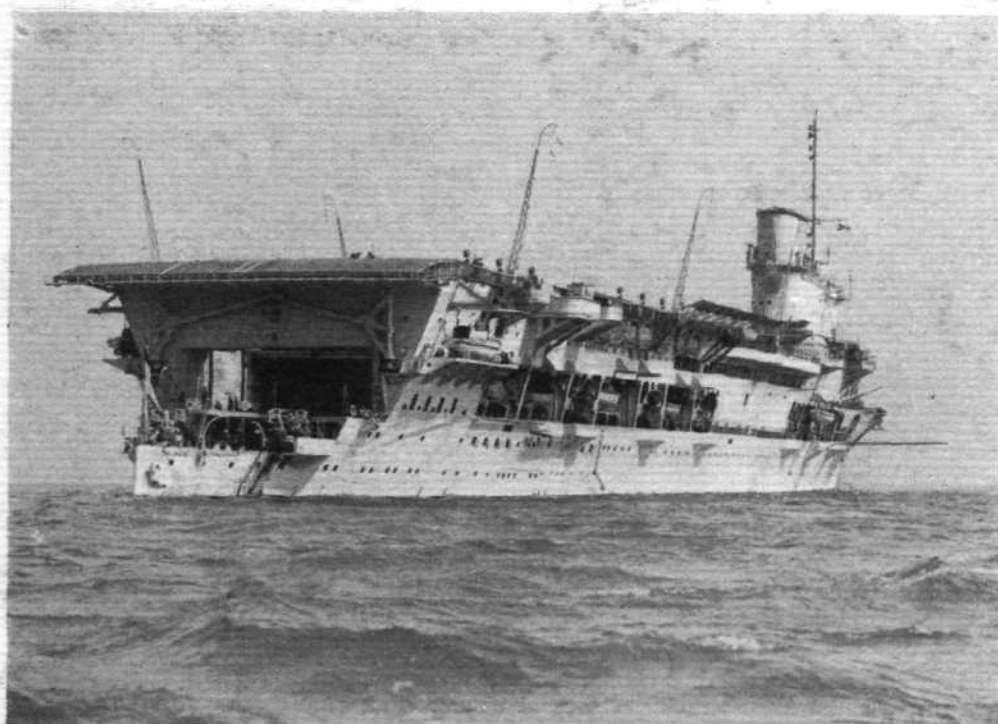
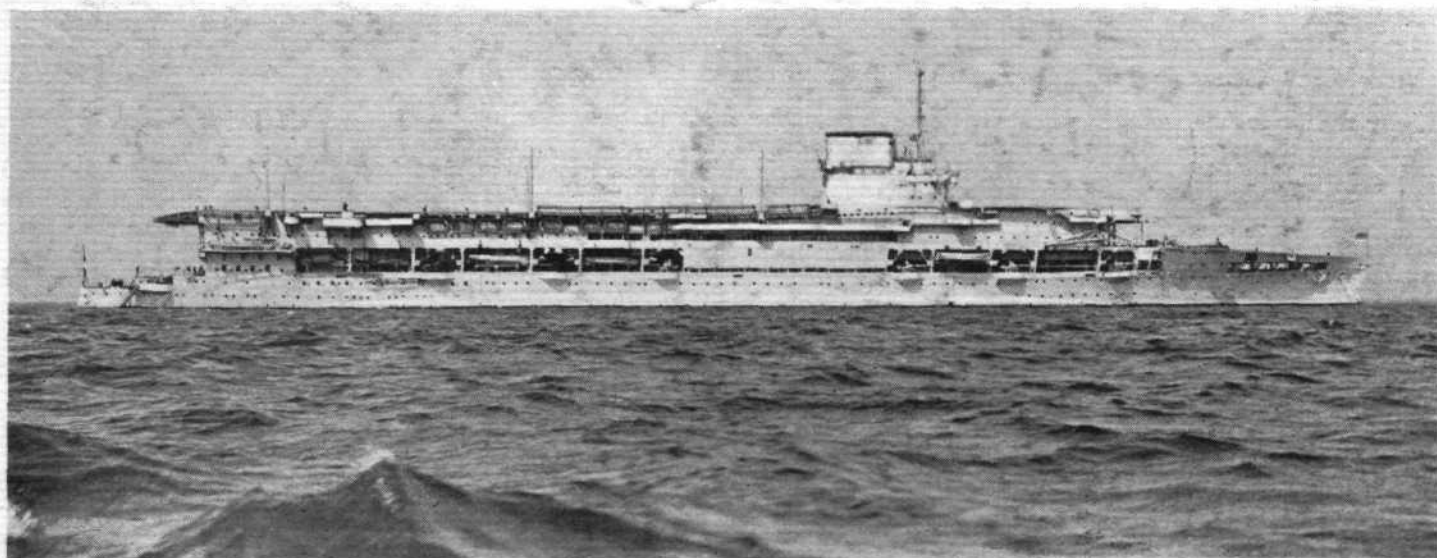
Her armament now consists of sixteen 4.7-in. guns, eight each side, all of which are H.A. guns, and she is therefore able to repel an attack from hostile aircraft by means of the guns as well as by her own aircraft.

The *Glorious* and *Courageous* were not used to any great extent during the war, and it is said that it was considered converting them to aircraft carriers many years before this actually came about.

The aircraft equipment consists of two flights of single-seater fleet fighters (Fairey Flycatchers), two flights of three-seater fleet spotter reconnaissance aircraft (Fairey III F's), and two flights of two-seater fleet torpedo bombers (Blackburn Ripons), making 36 aircraft in all.

Both the *Glorious* and the *Courageous* are what is called the "Island" type of carrier—that is, with the funnels and bridge placed on an island on one side of the flying deck. This is different to the *Furious*, which may be seen astern of the *Glorious* in the photograph at the bottom of the page, where the funnels have been built leading right aft and are flush with the flying deck, while the bridge is arranged as a





lift, so that when flying is in progress the entire flying deck is clear.

Our front photograph gives a very good idea of the width of the flying deck, which is left clear in spite of the island. The front end of the flying deck is rounded so as to ensure a smooth flow of air over the deck and to obviate any bumps

which might cause difficulties to the machines. Below the rounded portion can be seen the entrance to the upper hangar. In this hangar is one flight of Flycatchers, and some of our subsequent photographs show the aircraft flying straight out from here.

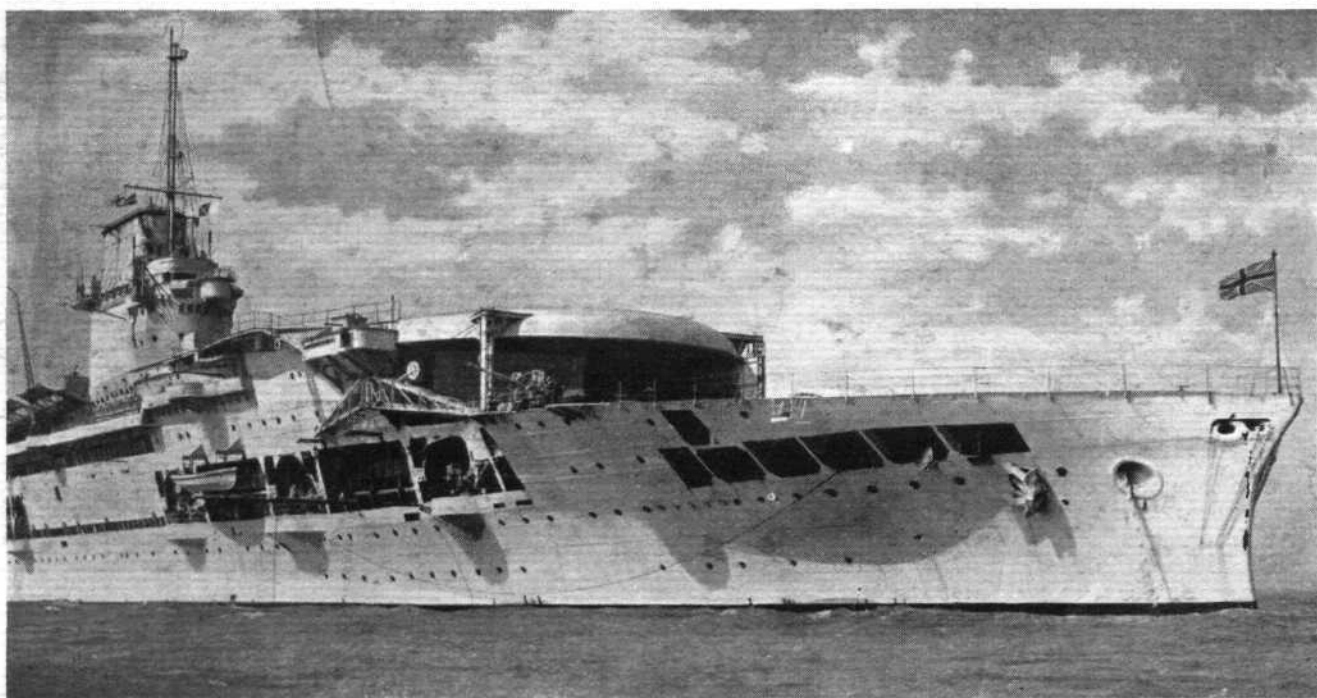
The side and stern views give an adequate idea of the enormous size of the upper works of such ships as these. In the stern view the rails which come up into position when the lifts, which take the aircraft from the flying deck to the hangars are down, can clearly be seen; this is to ensure that the space thus left in the flying deck is not left unguarded. In the same photograph the lattice-type small aerial masts can be seen in the raised position.

At the bottom of this page is a view taken from the bridge, of a Fairey III F just landing on the deck. Astern is the destroyer which always stands by when any flying is in progress; at the side of the deck can be seen the aerial masts now in the lowered position, and also the landing crew

standing on the platforms at the side of the deck ready to jump up and hold on to the machine as soon as she comes level with them. In front of the aircraft are the white guiding lines on the deck between which it is always endeavoured to land, and thereby ensure that the best use is made of the width of the deck and also minimise the



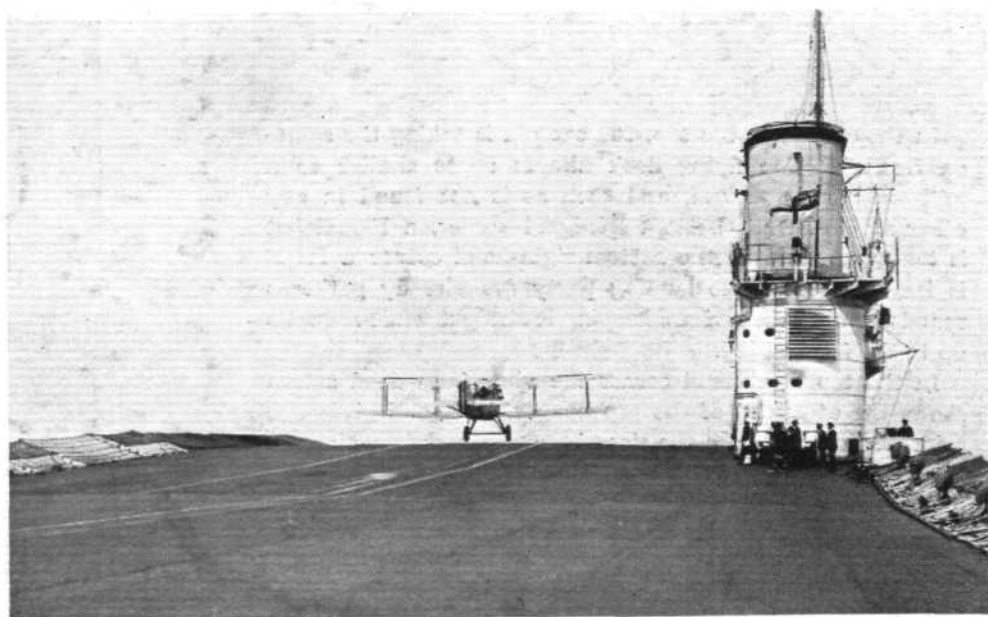




danger of going overboard or hitting the funnel.

On this page at the top, we show a closer view of the bow. Here can be seen the forward end of the top flying deck, while below it comes the lower flying deck, which is in effect an extension of the upper hangar. From this an idea can be obtained as to the space available for the fighters, which take off straight out of the upper hangar. When flying is actually taking place all obstructions such as stanchions, railings, and so on, are, of course, taken down clear, so that they cannot foul the aircraft in any way.

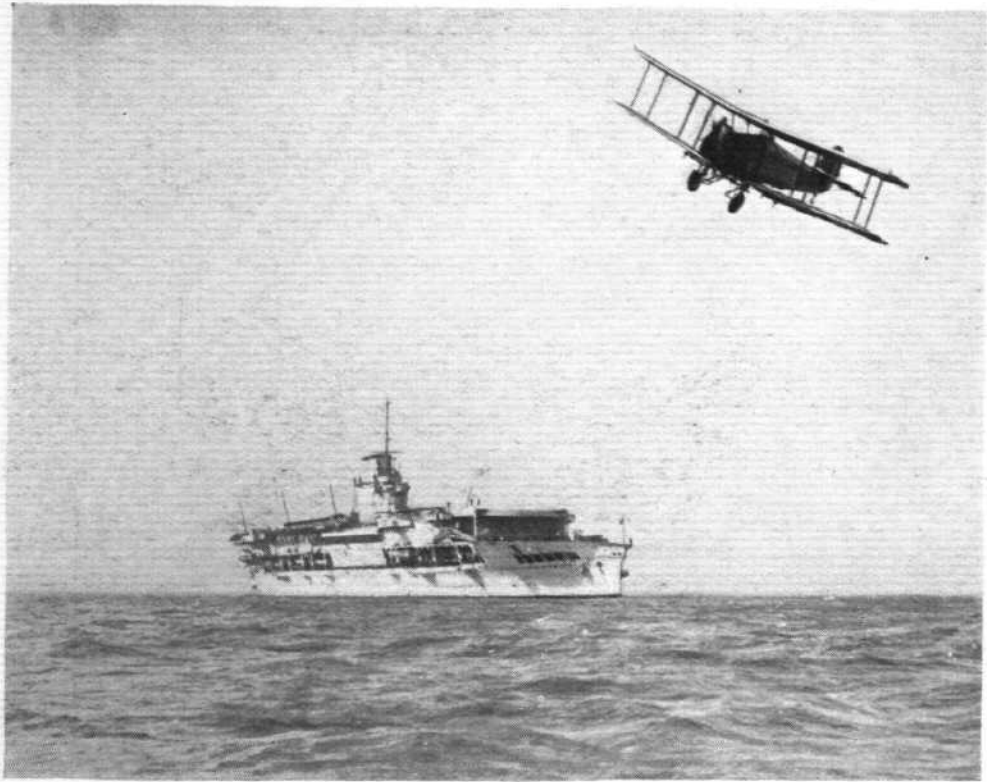
In the centre we are looking forward at a Fairey III F which is just taking off away from us. This view shows very clearly that, although the III F has a comparatively large span, she still has plenty of room when abreast the funnel or island, as it is called in this craft.



Below are three Fairey III F's and three Fairey Flycatchers lined up on the top flying deck. Here again one can get a good idea of the size of this deck, and can see that the landing and taking-off space available is considerably larger than many of the landing fields used by some of our joy-riding firms who operate without a constant wind speed

over their fields such as can be provided here at will. On the following two pages we have displayed a varied selection. At the top left-hand corner our photographer has caught a Blackburn Dart as well as the *Glorious* at anchor. The Dart torpedo-bombing aircraft is still used in some carriers, but it is being replaced by Blackburn Ripons.



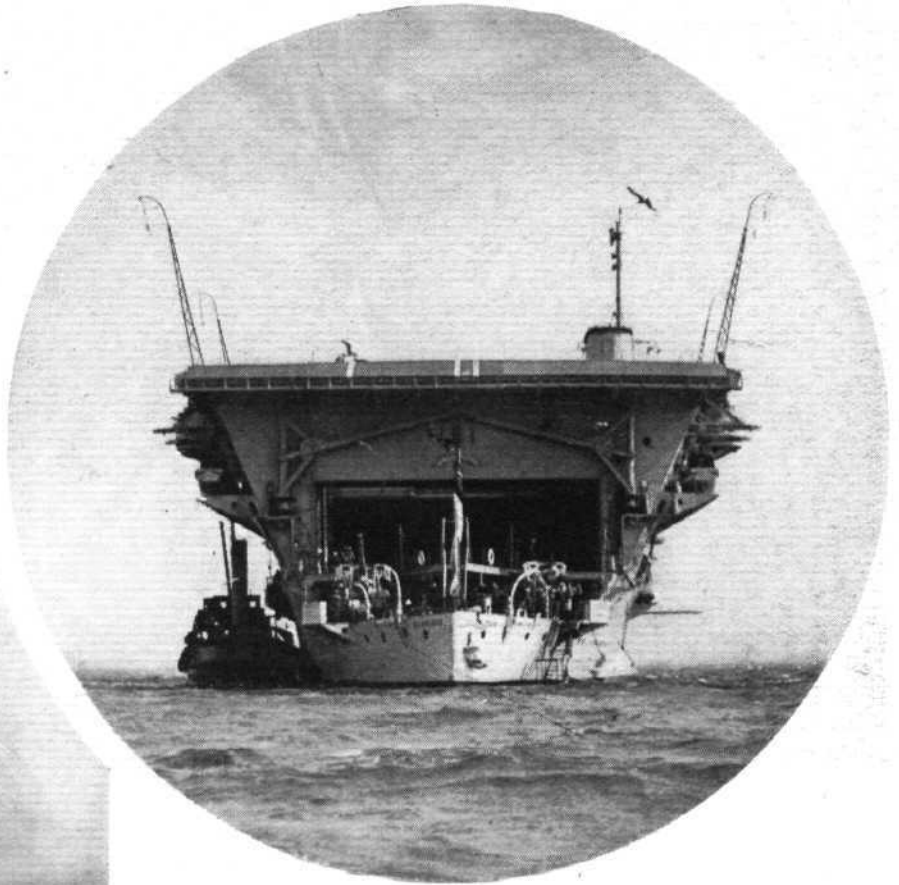


In the centre, at the top, the captain is taking the salute on Sunday. The flying deck affords space similar to a military parade ground, and such as is not found in any other ship. In the bottom left-hand corner, a Flycatcher is taking off, and in the bottom right-hand corner a III F is landing. Here the landing party are already gathered round the aircraft, and are keeping it straight while it taxis up to the forward lift.

In the top right-hand corner the view from dead astern shows the after end of the top hangar deck, and gives one a further impression of the size of the upper works which are necessary in a ship of this type.

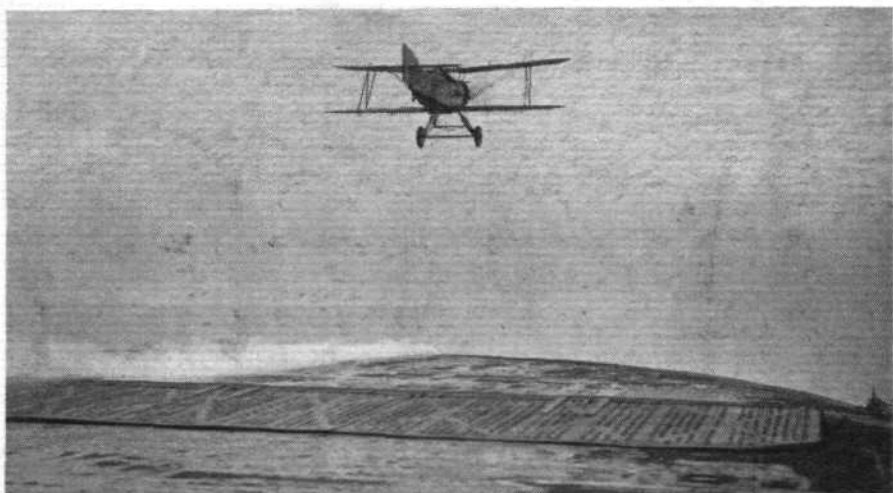
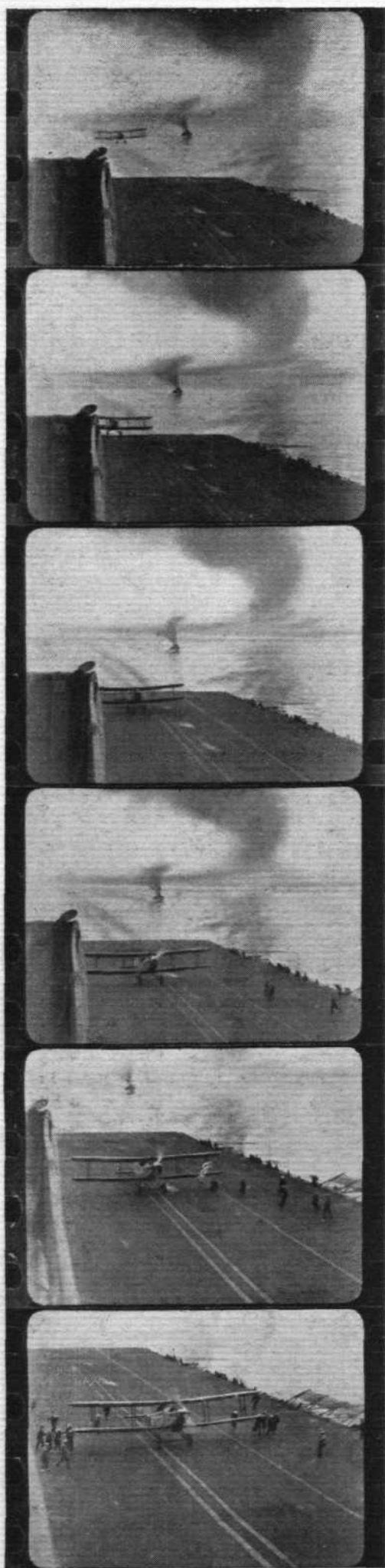






The centre photograph is unique, as our photographer has caught a III F just as the pilot gave the rudder a final kick to enable him to see the deck before landing. The smoke and hot air from the funnel are apt to cause bumps and bad visibility when coming up astern, and it is necessary to slew the aircraft about somewhat before putting her down in order to get a clear view of the deck.



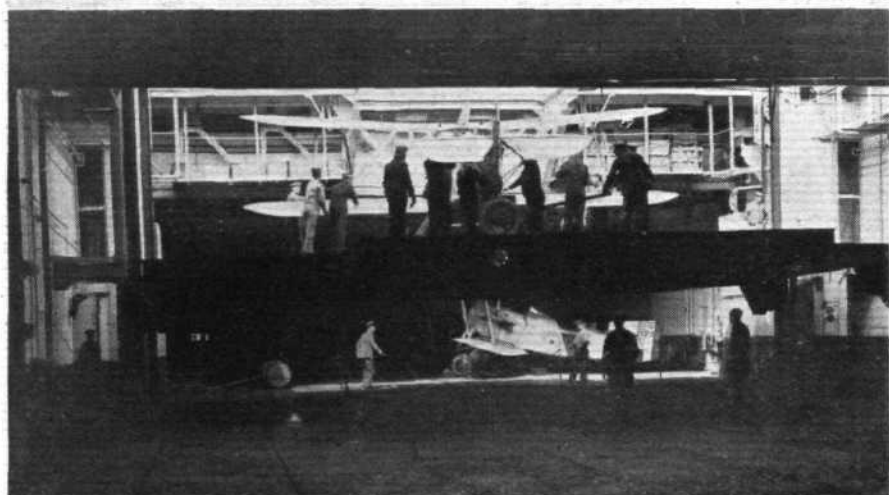
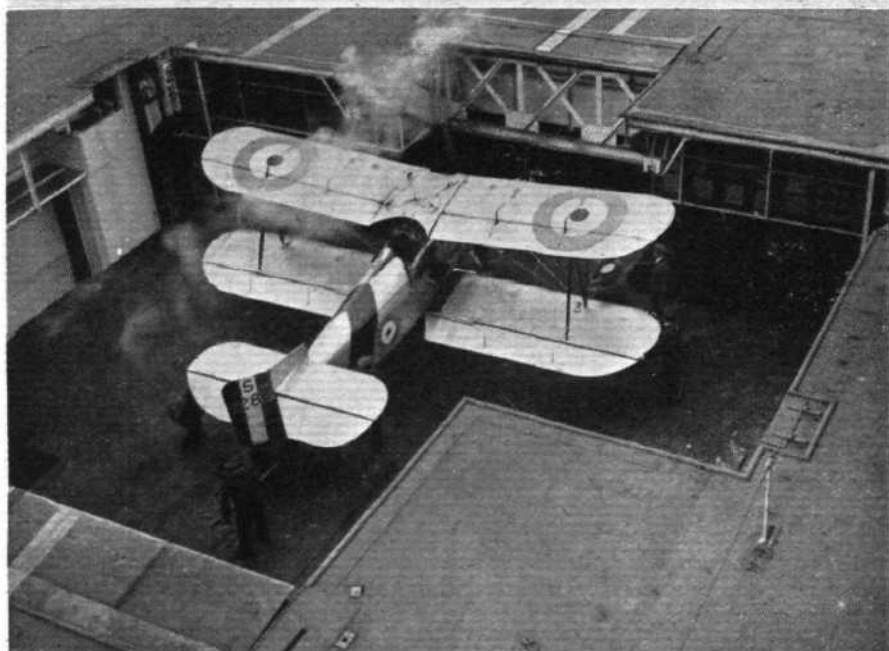


The series on the left on this page is taken from a cinema film, and are really self-explanatory. The Fairey III F can be seen approaching and finally landing.

Of the larger pictures, the top one shows a Flycatcher taking off from the flying deck, just as it has cleared the forward windscreen, which can now be seen laid prone, and flush with the deck, thus allowing the aircraft to take off over it without damage to their wheels. Another point to notice in this photograph is the steam jet. This jet comes from a steam pipe which opens right in the bows of the ship, and it serves to tell the navigator when the ship is heading directly into wind; this he does by altering course until the steam is going aft over the deck parallel to the landing lines.

The centre and lower pictures form a pair, and show a Flycatcher just emerging from the upper hangar and starting to fly off. The distance required to take off can be gauged from the fact that in the centre photograph the aircraft is just reaching the wind screen, while in the lower picture she has already well cleared it. When taking off in this fashion, the engines are, of course, run up in the hangar while the mechanics hold the aircraft back.

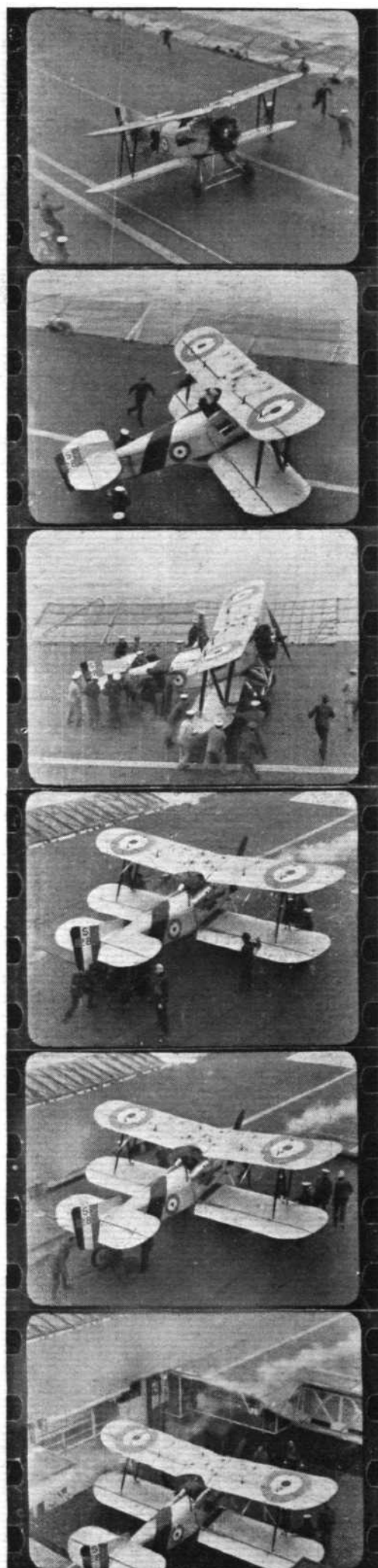


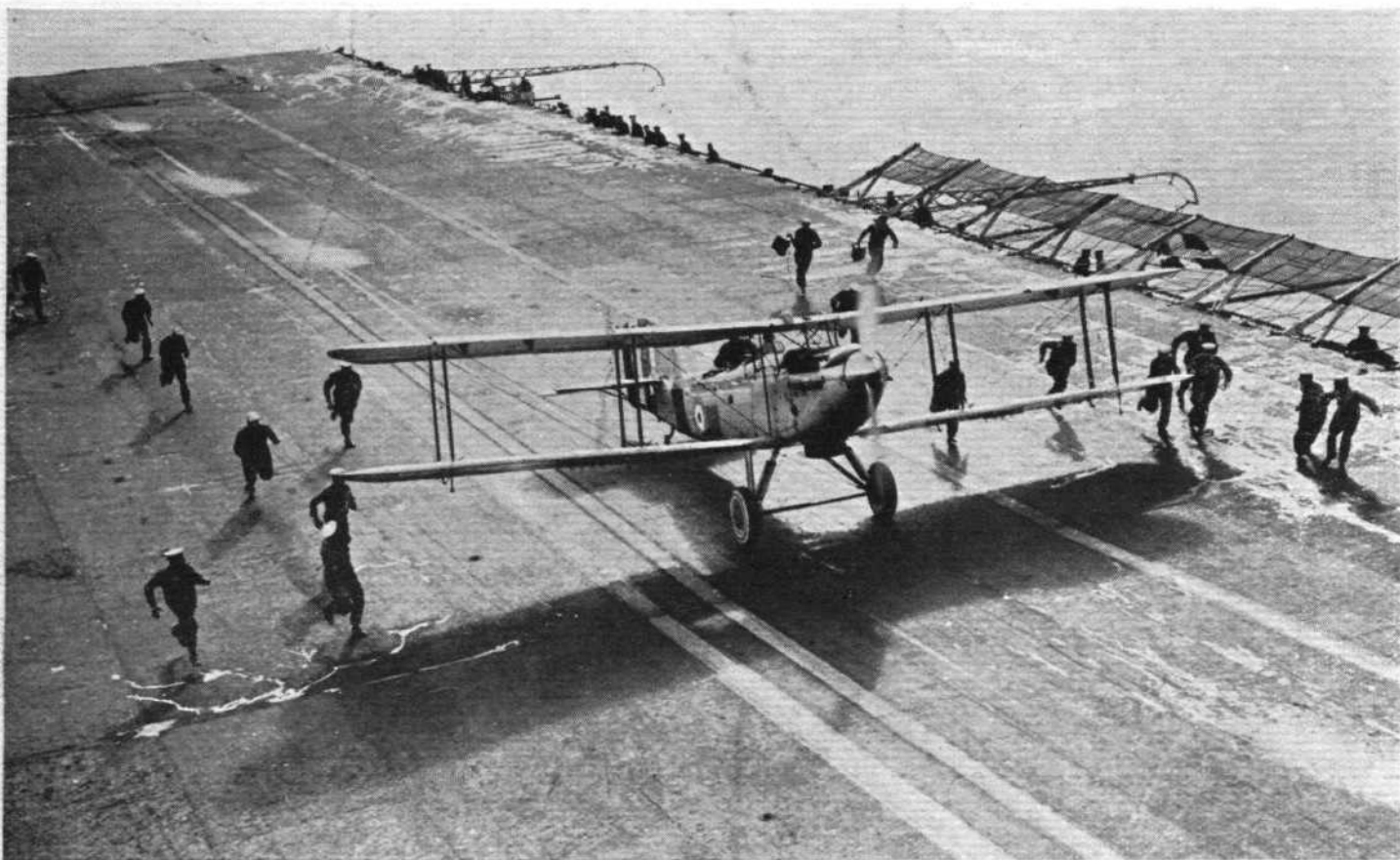


These three photographs also form a series, and are arranged to show the process of getting the aircraft down by the lift. These lifts are situated one forward and one aft of the flying deck, and are large enough to take the III F when the wings are half folded. The fighters can, of course, be lowered as they are, owing to their comparatively small span. The top photograph shows the Flycatcher being wheeled on to the lift. It should be noted that the wind-screens are raised both at the side and in the front. These screens are raised when the wind interferes with such work on the flying deck, and are lowered again when flying continues.

In the second picture, the lift has gone down a little, and the size of the platform can be seen.

The bottom photograph was taken from between decks, and shows the lift about half-way down with a Flycatcher on it coming down. Beneath the lift, and forward of it, are other machines of the flight which have already been housed in the hangar. On the right is a further selection from a cinema film, in this case showing a Flycatcher which landed and then got caught in a gust and slewed toward the ship's side before the landing crew had time to catch it; it was then righted, wheeled forward to the lift and sent down.





Above we have a Fairey III F landing. The landing crew are just running out to hold on to each wing tip, and thus prevent the aircraft slewing toward the ship side. This would not necessarily mean a disaster, as right on the right will be seen the wire netting pallisades which prevent a machine from actually falling into the sea should she slew round.

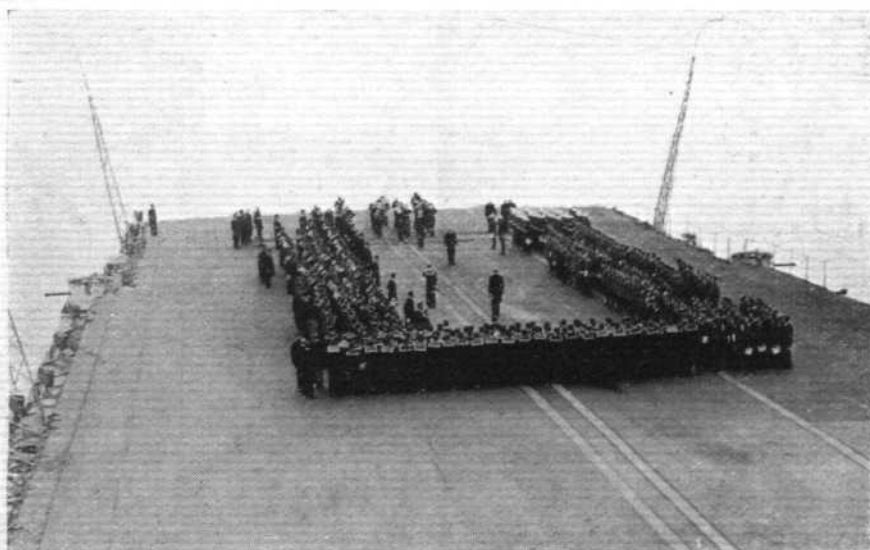
Below is another view, taken on Sunday, of Church Service being held on the flying deck.

Life on board a carrier differs in many ways from that in any ordinary ship. Firstly, there are only a few guns to look after, in this case sixteen 4.7 in. Actually to attend to the mechanical side of the aircraft, R.A.F. mechanics are carried who, after a period on board, are drafted back to a shore depot. The pilots are both Naval officers and officers from the R.A.F. The proportion of Naval to R.A.F. pilots is about 2 to 1, and about two-thirds of the flights are commanded by Naval officers. The standard of flying is, of course, very high indeed, and it is interesting to note that at Hendon this year, at least one flight of Flycatchers will

be taking part. During our visit, we were privileged to see some formation flying by one of the fighter flights, and the flying was almost perfect.

There is one point about flying Fleet Air Arm aircraft which seems beyond comprehension and that is, why parachutes are not worn. In the R.A.F., quite a considerable number of lives are saved every year by all pilots having to wear parachutes. In the Fleet Air Arm parachutes are apparently not worn on account of the alleged difficulty of disconnecting the chute and the harness when alighting in the water.

There is, however, at least one quick release on the market which would overcome all these difficulties, but like so many good things, it will probably take a very long time before it comes into general Service use. At present, the pilots are provided with life-saving waistcoats much after the same pattern which used to be popular during the war. The waistcoat has an inflatable tube around under the armpits, and before taking off, the pilot slightly inflates this so that it will be all clear should the untoward happen.





## SHELL MEX AND THE CAPE FLIGHT

THE Directors of Shell-Mex, Ltd., gave a lunch at the Savoy Hotel, on Wednesday, May 14, to welcome the Duchess of Bedford, Capt. C. D. Barnard and Mr. R. Little. The Chairman of the firm, Mr. S. Samuel, M.P., was in the chair. In proposing the health of the Duchess and her companions, the Chairman said that he did not propose to make a long speech, as he had suffered from such in another place at the end of the Embankment. He had been kept up till past 5 a.m. that morning by a debate on mental deficiency. The Government had had a large majority. The Duchess, he said, had done a very great thing. He congratulated Mr. Fedden, whose engine had achieved almost the impossible. He hoped the example of this flight would be followed by thousands of others.

The Duchess of Bedford, replying, paid a testimony to the organization of the Shell-Mex Company. Only those who had made long flights could appreciate how much it meant to the pilot to be able to start refuelling as soon as he landed, for there was always from 4 to 6 hours' work to be done on the engine. The merits of Shell petrol did not need a testimony from her, but a tribute to good service and the courtesy of the Shell representatives was never superfluous.

Sir Sefton Brancker said that the Duchess was precisely what they wanted, a quiet, unassuming, businesslike woman. Barnard was a pilot who, in addition to skill, had that divine thing called Luck. Little had upheld the highest traditions of ground engineers. The party asked the Air Ministry for no pecuniary help. They simply did it, and they filled his heart with joy. The flight was the best thing in civil flying for many years.

Capt. Barnard said that they had flown 8,500 miles in 10 days with 10 landings. On the journey out the aerodromes were waterlogged as far as Bulawayo. At short notice they had to divert their course to Juba, yet they found supplies of Shell ready for them there. When approaching Cairo he

wanted to take a photograph of the Pyramids and asked Little to pass him a map. The latter replied that he had only an old one, so did not suppose that the Pyramids would be marked. He thought that the Duchess must have had an appallingly boring time sitting in the aeroplane for so long, day after day. He paid a tribute to the help given them by all foreign air services and by the South African Air Force.

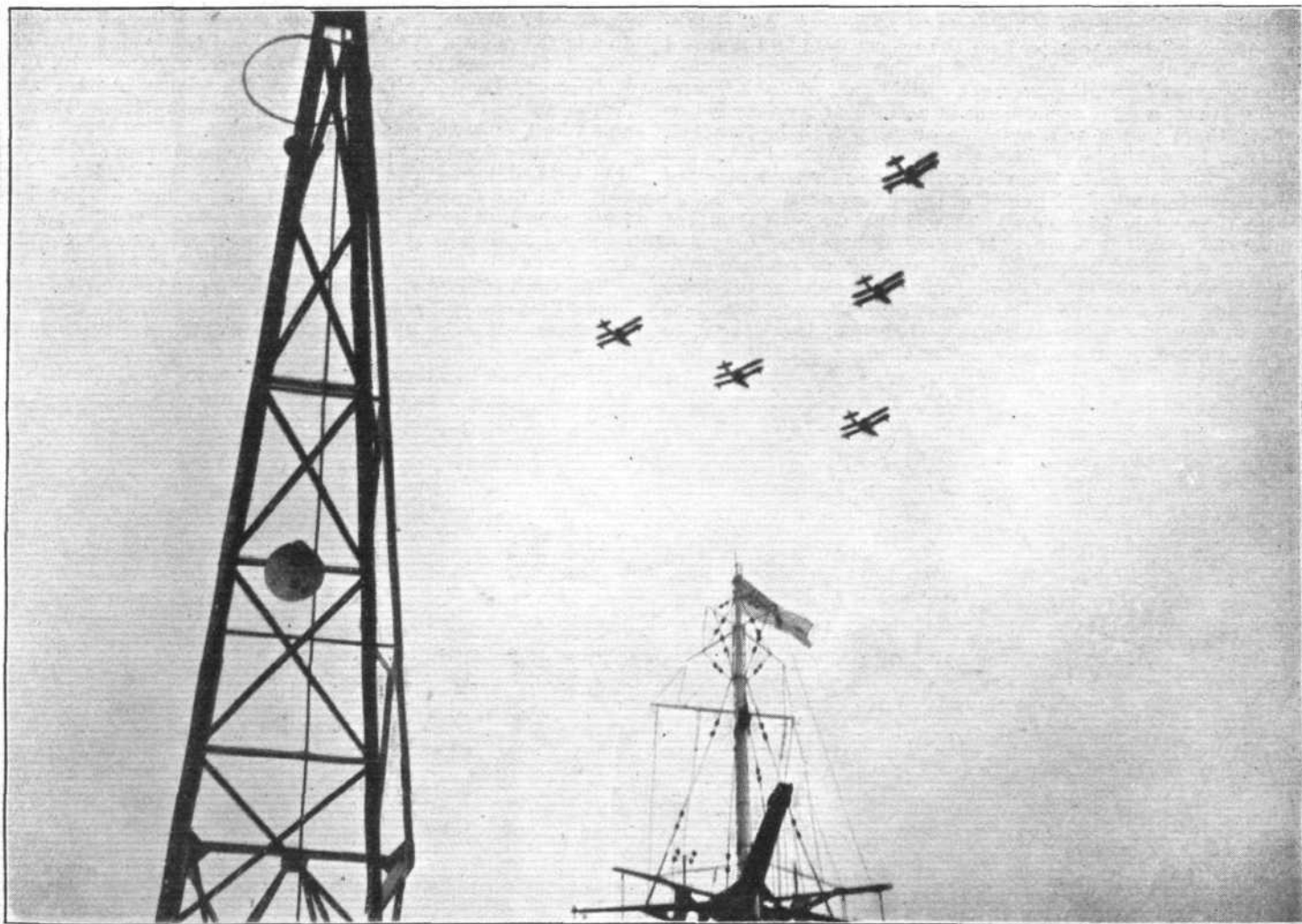
Mr. Little briefly added his testimony to the efficiency of Shell-Mex organization. There was prohibition in South Africa on Sundays, and when working on the machine on a Sunday at Capetown, he had become exceedingly dry. But the Shell representatives had solved even that problem.

## Croydon Hears Capt. Barnard

On Monday, May 12, at the Davis Theatre, Capt. Barnard gave a very clear and lucid account of his trip with the Duchess of Bedford to the Cape and back. The occasion was the first presentation of the film "Flight," which was criticised in this paper for January 24 this year. Before the film was shown to the crowded house, Capt. Barnard gave his talk, in which he described briefly the progress of their historic flight, giving graphic details of their adventures and the sights which would have thrilled the most hardened traveller.

The management of the Davis Theatre are to be congratulated for their enterprise in obtaining Capt. Barnard to come before the screen in this manner, and thus lend added attraction to an already attractive film. The story of the film is already well-known, as it has run in the West-End for some time, and it will suffice to say that it is undoubtedly one of the best talking films concerning flying that has been presented to the public of this country.

The dialogue is very American, but that goes in keeping with the picture, which is entirely an American story, and not, as is too often the case, a pseudo-English scenario.



THE AIRCRAFT CARRIER IN AUSTRALIA: A Flight of Supermarine-Napier "Seagulls" of the Royal Australian Air Force flying over their Carrier, the "Albatross."

# PRIVATE FLYING AND CLUB NEWS

**PARNHAM COUNTRY CLUB.** On Saturday, May 10, Miss Sicele O'Brien organised a small flying display for the benefit of the Parnham Country Club which is near Beaminster in Dorset. An attractive little programme had been arranged but the weather prevented things going as planned.

To start with there was a Rally or Arrival Competition, the winner being the one to cross the aerodrome nearest to noon. Mr. Jackaman, who makes a habit of winning most things he goes in for, arrived at two seconds past noon and took the first prize, while Mr. and Mrs. Chalmers came a second afterwards for second prize, and Flt.-Lt. Rose who is always to the fore where skilled piloting is called for, arrived half a second later.

Miss O'Brien had chosen a field on the top of a hill a little way away from the Club and though in some directions of the wind it would not have been too good an aerodrome it was quite satisfactory on that day. A lunch was given at the Club, which is one of the most wonderful and delightful old houses in England and was at one time the home of the Moorhouses, whose son Rhodes was posthumously awarded the V.C. after he died of wounds received while bombing Courtrai on April 27, 1915. The house has now been bought by a syndicate who have spent some £100,000 on modernising it and the result is one of the most attractive resting places one can possibly imagine. At the end of lunch Sir Sefton Brancker made a short and appropriate speech wishing the club a successful future. After lunch, Flt.-Lt. Rose gave one of his usual finished aerobatic displays over the club grounds and was watched by quite a large crowd which had by this time come from the surrounding country in spite of the rain. Thereafter followed displays by P/O. Brunton on a Westland Widgeon and Mr. Rogers on a Klemm. A "Bombing the car" turn was next on the programme and a crowd of some thousand had assembled on the golf course for this. The "bombs" had, however, got mislaid and, while they were being found, a pilot came along in a Moth and proceeded to show them just how a machine ought not to be handled. He flew below the level of the trees in the park and made flat gliding turns close to them in such a manner that many of the spectators who had hardly even seen an aeroplane before were thoroughly frightened. This is the sort of thing that must be guarded against, especially where the crowd is largely composed of people who have yet to become sufficiently air-minded to be blasé about flying risks, and it is for this purpose that the Air Ministry are allowing Mr. Jeffs to attend many flying meetings on behalf of the R.Ae.C. to control the flying from this point of view.

After the "bombs" had been found, Flt.-Lt. Rose proceeded to bomb the car without however endangering the lives of the driver and his mate.

Parnham Club is making special terms for those who arrive by air and we can thoroughly recommend it for those wishing for a quiet week-end in one of the most peaceful corners of England.

**LONDON AEROPLANE CLUB.**—The Committee of the London Aeroplane Club has decided to close down the club on Saturday, May 31, in order that all available aircraft may visit the Air Pageant at Bristol on that day.

The Club has entered two machines in the race for the Society of British Aircraft Constructors' Challenge Cup, and Mr. J. C. V. K. Watson and Mr. O. J. Tapper have been selected as the pilots.

The Club has also made one entry for the Bristol Aerial Derby, the pilot being Capt. F. R. Matthews.

The Club aircraft will fly to Bristol in formation, and the following members have been selected for the flight:—Capt. A. G. Lamplugh, R. O. I. Muntz, A. C. L. Rendel, T. E. Rose-Richards, E. E. Stammers.

Members will learn with regret of the accident on Saturday last to Mr. C. Humphreys, the Club's chief ground engineer. He was struck by a propeller on the right arm, and although no bones were broken, he is suffering from severe laceration, which will keep him away from his duties for several weeks.

**THE HAMPSHIRE AEROPLANE CLUB.**—The flying time for the month of April was 241 hr., of which 80 hr. 5 min. was dual instruction, 146 hr. solo, and 14 hr. 55 min. passengers' flights, etc.; 19 new members joined the Club during the month. The President, Lord Louis Mountbatten, passed the tests for his "A" Licence, together with Lts. Robertson, Donkin, Tanner, Targett-Adams, Abram and Ashburner and Messrs. Bowman and Gordon. Messrs. Berney and Ward achieved successful first solos.

On Easter Sunday, the first landing competition of the year was held and was won by Sub.-Lt. D. Cambell, R.N. He will hold the Trophy—a silver model of a Moth—which has been presented by the Club, until the next competition. In addition, he will be given a cup by the De Havilland Aircraft Co.

The Club billiard-room has now been completed, and it is hoped that this will prove attractive, particularly to Associate Members. A series of competitions will be held throughout the year.



**WELL EQUIPPED "AVIANS":** A group of five "Avians" equipped with Goodyear Air-wheels and Handley-Page slots, ready for delivery by the Ottawa Car Co., the Canadian licensees for A. V. Roe, Ltd.



**AVIATORS AND THE THAMES VALLEY.** Complaints have been received by the Automobile Association from landowners in the Thames Valley that pilots of aircraft have been landing in fields that are laid down for hay. Pilots are particularly requested not to make landings at the following places:—**MOULSFORD.**—The fields on either side of the "Wedge and Beetle" Hotel. **SONNING.**—A large field a quarter of a mile north-east of the "White Hart" Hotel. **BRAY.**—Two fields in the bend of the river north-east of the village. A large field in which there is a gravel pit one mile south of Bray.

**THE BRISTOL AIRPORT.** The following facts concerning this airport should be of interest. The Bristol Municipal Airport is the property of the Corporation, and the control is vested in the "Airport" Committee of the Council.

There is a Management Committee with representatives, both of the Council and the Bristol and Wessex Aeroplane Club, Ltd., whose permanent staff also act as aerodrome officials on behalf of the Corporation.

The Corporation purchased the necessary land for the airport, and themselves carried out all levelling, draining, etc., the buildings being erected by contractors.

The Corporation act as aerodrome proprietors, providing the essential services such as weather reports, wind indicators, first-aid equipment, social amenities, accommodation for aircraft, one petrol and oil station, etc.

Flight tuition is provided by the Bristol and Wessex Aeroplane Club, but aircraft sales, operation, taxi services, joy riding, repairs, maintenance, etc., are to be carried out by commercial companies, paying the Corporation a rent for the privilege of trading at the airport.

Attractive show rooms are available for those wishing to sell and distribute aircraft from Bristol, while terms for accommodation, etc., may be had on application from the manager.

The Corporation do not intend to give monopolies to any one trading concern, but in the early days the "First Comer" may possibly be given some form of privileged terms.

The airport will be open from sunrise to sunset every day of the year.

The Corporation have reserved land adjoining the airport upon which it is hoped that aircraft and engine works or assembly plants will be developed, the airport being conveniently situated to the Bristol and Avonmouth Ocean Docks.

All inquiries should be addressed to the manager, the Bristol Airport, Bristol.

The official opening, as we have previously announced, is on Saturday, May 31, when a Pageant and R.A.F. Display will be held. The following instructions to visiting pilots should be observed:—1. It is essential that visiting pilots arrive at the airport before 2 p.m. After this time, arrivals will seriously interfere with the flying programme.

(2) The greatest care should be taken when approaching on arrival, as from 10 a.m., onwards, heats of races, joy-riding and exhibition flights, etc., will be in progress.

(3) Immediately on landing each pilot must report to the flying control tent, situated at the eastern side of the aerodrome, where he will receive instructions for parking, etc.

Throughout the day no pilot will be allowed to take off without the permission of the flying control official.

Left-hand circuits must be rigidly observed.

No unauthorised stunting will be permitted.

Flying gaps will be arranged so that approach to the aerodrome is possible from any direction without flying over an enclosure.

Pilots are particularly requested not to land or take off across wind.

In the event of there being no wind the direction of landing will be indicated by a T.

Competitors are reminded that it is essential for them to arrive by midday Friday.

All competitors and visitors by air will be under the control of the promoters.



**A NEW VENTURE:** Capt. Stack standing alongside his "Hermes-Moth," the property of S. Smith and Sons for whom he is now flying. (FLIGHT Photo.)

**BROOKLANDS AIR PAGEANT.**—For the first time in the history of Brooklands the Brooklands Automobile Racing Club is, on Saturday, May 17, to hold a great Air Display and Pageant.

Starting at 3 p.m., the programme will include:—

Flt-Lt. Rose on Moth G-AAKJ in an aerobatic display.

Demonstration of slow flying on a "Klemm" monoplane.

Mr. George Murray on a Brooklands School of Flying machine.

"Walking the Wings," by "Jock" Anderson. Pilot: Lt.-Col. Henderson, M.C., A.F.C.

Mr. Sidney St. Barbe on a Comper Swift monoplane.

Mr. Dudley Watt on a D.W.2 training machine.

Capt. Hubert Broad, A.F.C., on Gipsy Moth G-AALT.

Mr. John Trantum, parachute descent on a Russell-Lobe parachute. Pilot, H. D. Davis.

A demonstration of the "Martlet."

A demonstration of the Autogiro.

Sharp shooting. Pilot: Mr. G. Lowdell, with Air Commander Crak Shot, Y.M.C.A., as passenger.

Maj. Clark on a "Junkers Junior."

"Bombing a car." Pilots: Messrs. E. A. Jones and G. Lowdell.

Flt.-Lt. Thorn on Avro Avian, Hermes engine.

Price of admission (including tax) is 2s. 6d. per head (children under 14, 1s. each), while cars will be admitted at 2s. 6d. each and motor-cycles at 1s.

**MOTHS** in the King's Cup. In view of the fact that Moths are continually changing hands, the De Havilland Aircraft Co. state that it is impossible for them to keep a record of every owner, with the consequence that notifications cannot be communicated by direct circularisation. The company, therefore, wish to draw the attention, through the columns of FLIGHT, of those Moth owners who wish to enter for the King's Cup Race, to be held on July 5, to the necessity of communicating immediately with the company in the event of their requiring special work done or equipment supplied. Immediate notice is especially necessary in the case of special aircrews to prevent the engine of a cleaned-up machine "over-revving," these taking a fortnight to manufacture.

All communications on this subject should be addressed to:—Mr. H. Buckingham, The De Havilland Aircraft Co., Ltd., Stag Lane Aerodrome, Edgware, Middlesex.

**THE NORTHAMPTONSHIRE AERO CLUB** flew 61 hr. 40 min. during April. This was made up by 40 hr. 10 min. dual instruction, 12 hr. 20 min. solo flying and 9 hr. 10 min. tests, etc. Flying for the month has increased, although weather conditions prevented a record being achieved. The week ending April 12 was a record week, with 25 hr. 50 min. Four new members have flown solo. Miss M. Olney, the first lady soloist, after 15 hr. 15 min. dual. Lord Willoughby de Broke after 10 hr. dual. Mr. James with 18 hr. 35 min. dual, and Miss Tyzack with 10 hr. 30 min. dual. Membership has increased by 8 Flying members and 20 Associates, making a total of 415 members. A large lounge has now been added to the existing club house, making a very attractive dance room, tea room, etc.

# THE YORKSHIRE CLUB'S MEETING

IT was apparent last Saturday, May 10, that N.F.S. were on their mettle in organising and producing the Yorkshire Air Pageant at Sherburn. For a fortnight previously their publicity department had waged an extensive campaign in the East and West Ridings, and during the entire programme, from the N.F.S. directors downwards, there was a

laps for private owners. Appropriately so, it developed into a sporting War of the Roses, for Miss Winifred Brown, of the Lancastrians, challenged Mr. Ivor Thompson, of the Yorkshire Club, for leading position.

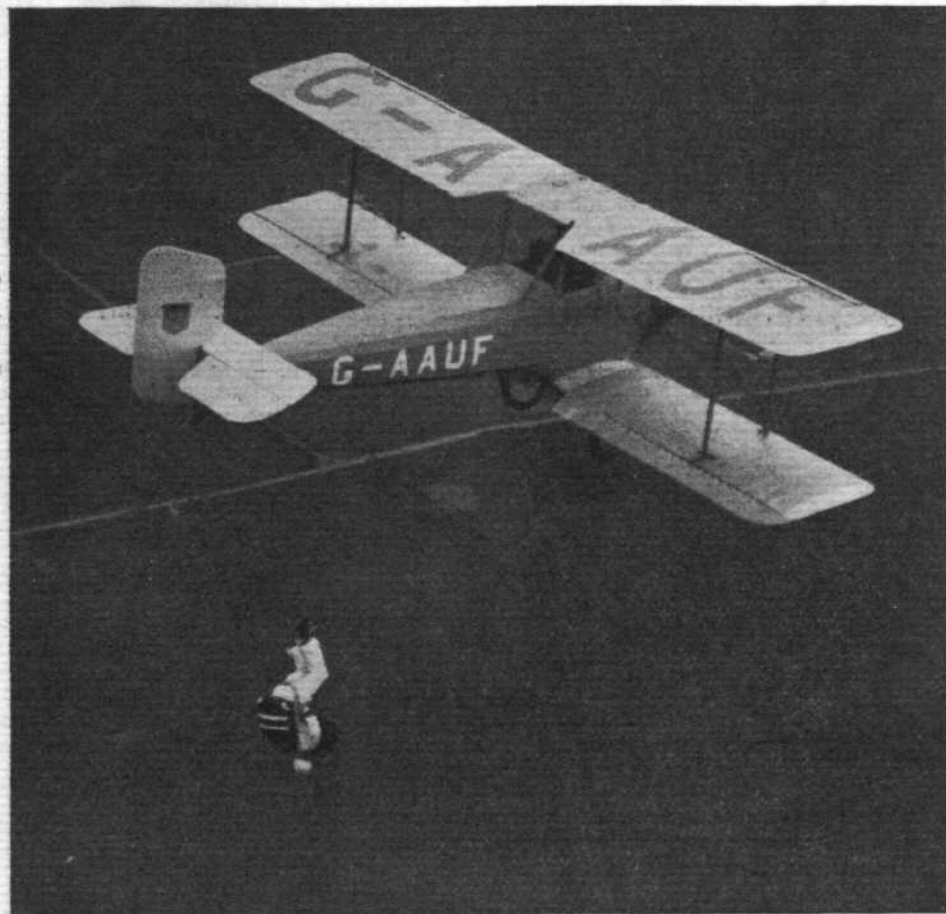
When Miss Brown still possessed a considerable portion of her 2-min. 42 sec. handicap allowance at the beginning of the third and last lap, one did not judge that Mr. Thompson, although pulling well on his coupé Gipsy-Moth "CL," could quite overtake her. That he did succeed by split seconds was a triumph for the home club and gratifying to the handicapper. Miss Brown flew her Cirrus-Avian "VZ."

Lady Bailey gave a dashing display in this race on her Coupé Gipsy Moth "EE," and two Yorkshire private owners, Mr. G. A. Ambler on Gipsy-Moth "BI" and Mr. A. C. Pollock on Coupé Gipsy-Moth "GT," were close runners-up with Lady Bailey, the trio each returning a speed of 98 m.p.h.

Mr. Thompson, who flew Mr. Mallinson's machine with Mrs. Mallinson as passenger, covered the course in 19 min. 53 sec. at 101 m.p.h. Miss Brown's time and performance were 19 min. 55 sec. and 87½ m.p.h.

Lord Brotherton, the "Patron saint" of Yorkshire aviation, as Lt.-Col. Ivor Edwards aptly termed him, presented the winner with a large silver cup and Miss Brown with a silver cigarette-case.

Ivor Thompson is the pride of the Yorkshire Club, this *ab initio* pupil who has achieved a "B" licence and is guaranteed to perform any stunt called for. He gave a polished exhibition on an N.F.S. Cirrus-Moth which no professional could sneer at. Ivor also ran away with a silver cup for the "All Forms of Transport," a farcical event and a happy one. Even now one can chuckle at the vain attempts of a male



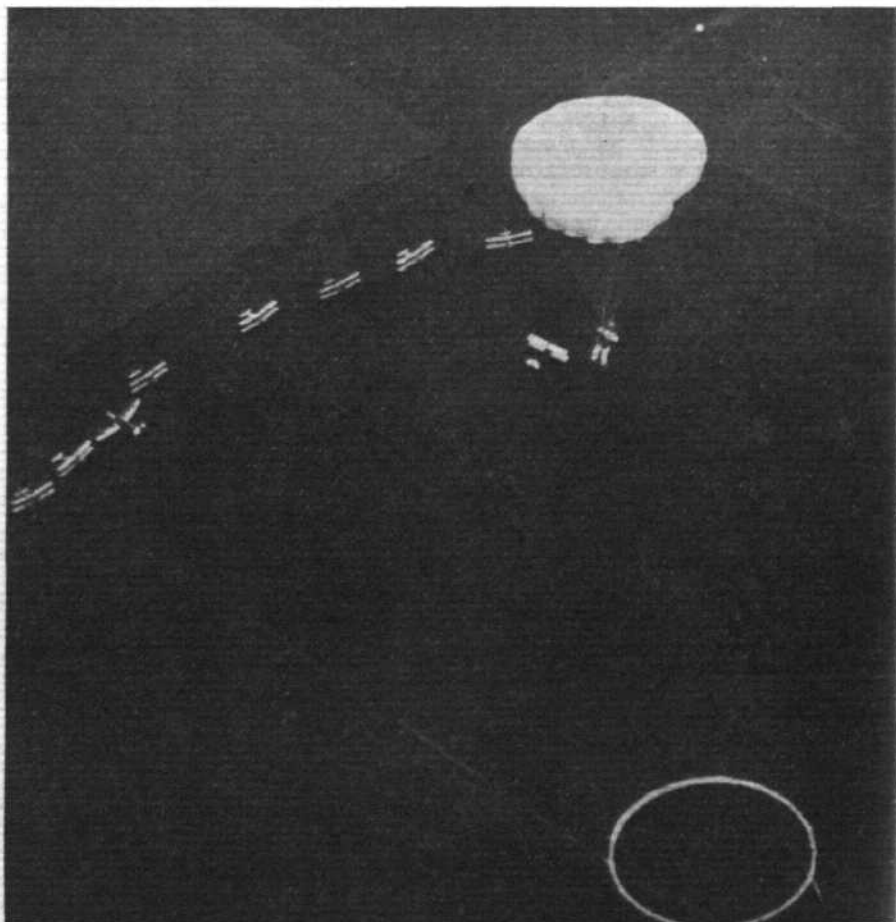
**INVERTED DESCENDING!** Mr. John Trantum makes a well-timed shot for the centre of the aerodrome at Sherburn. (FLIGHT Photos.)

patently anxious desire for an expedient and faultless display of flying. From the control tower Mr. G. E. C. Boyes, N.F.S. director, kept a ceaseless vigilance upon the succession of events, punctuating an excellent broadcast with terse warnings to competitors and officials when an unnecessary lull threatened.

The measure of success which attended this team effort was generous and deserved. All expectations which the programme engendered were not gratified, but no blame was due to N.F.S. The Autogiro failed to arrive owing to its sudden call to more important duties, connected with State, elsewhere. The Comper "Swift" should have been displayed, but, although it arrived, it developed inopportune piston trouble and suddenly disappeared before the programme began. However, we were compensated by a remarkably fine demonstration by F/O. Snaith before the engine trouble developed.

Most critics of flying meetings are satisfied by long experience that the introduction of a competitive spirit is vital to their success. Too many races have been known to spoil the broth, but one carefully handicapped event is an assured attraction, especially when pilots of public renown are engaged and the broadcasting is informative and spontaneous.

The Yorkshire Air Race on Saturday crowned the events in sequence and in result. It was a 30-mile race divided into three short





pilot of human size to mount the smooth convex body of a black horse registering umpteen hands. And in the midst of hilarity all the horses suddenly stampeded!

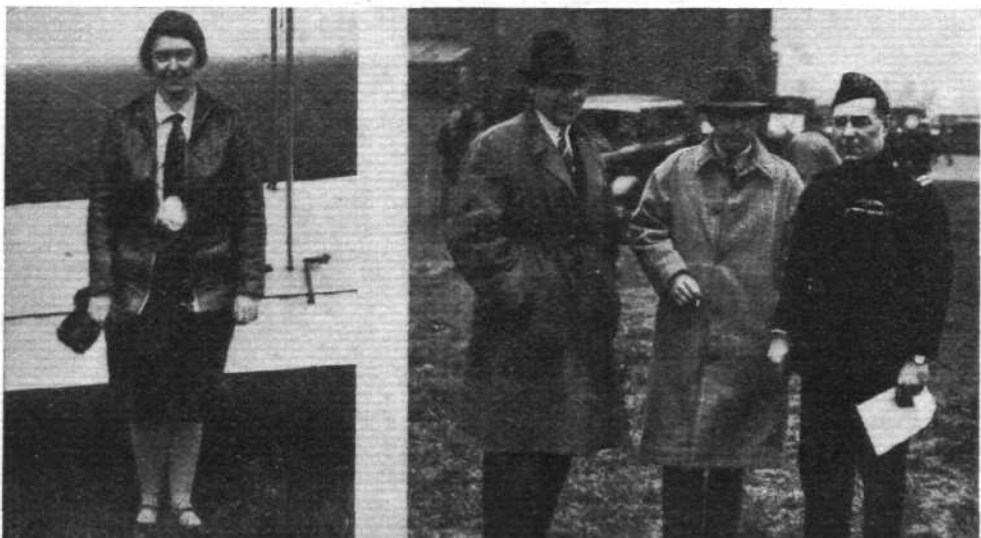
Lt. R. R. Bentley, of the Shell Co., whose example of an ordinary tour is between Croydon and the Cape—either way, he is not particular—shared Mr. Thompson's day of triumph. He won the Balloon-bursting competition and then went "crazy" on his Hermes-Moth. And how "crazy" he did go!

If we report that Flt.-Lt. H. M. Schofield again demonstrated the manoeuvrability of the Desoutter cabin monoplane it may not be original news, but let us assure you that it is still interesting to crane one's neck over. And remember that Schofield has Schneider traditions to perpetuate. And don't they remind you of it from the control tower! Can we be permitted pedantry and remind the public voice that it is a *trophy* and not a *cup*?

F./O. H. A. Love blew up the level crossing, but if there is a joke hidden in this event, some of those zealous Northern camera-men will meet it as a bad joke one day if they persist in close-ups instead of long shots. Still, it is, perhaps, better to face a "bombing" from above than a blowing up from art editors.

The beginning of a sudden escape of an unknown pilot with an N.F.S. Cirrus-Moth was badly timed, but compensation soon followed. He took off, rudder "fluttering" and down wind, and ran through the antics of a novice at the controls. Many novices must have wished they could achieve such "bad" flying and live to tell the tale!

There was the usual fly-past, but it was a bad slip to cut out the procession past the enclosures. The public are very inquisitive, like all human beings. A close-up of intrepid airmen and airwomen is balm to their souls. An old



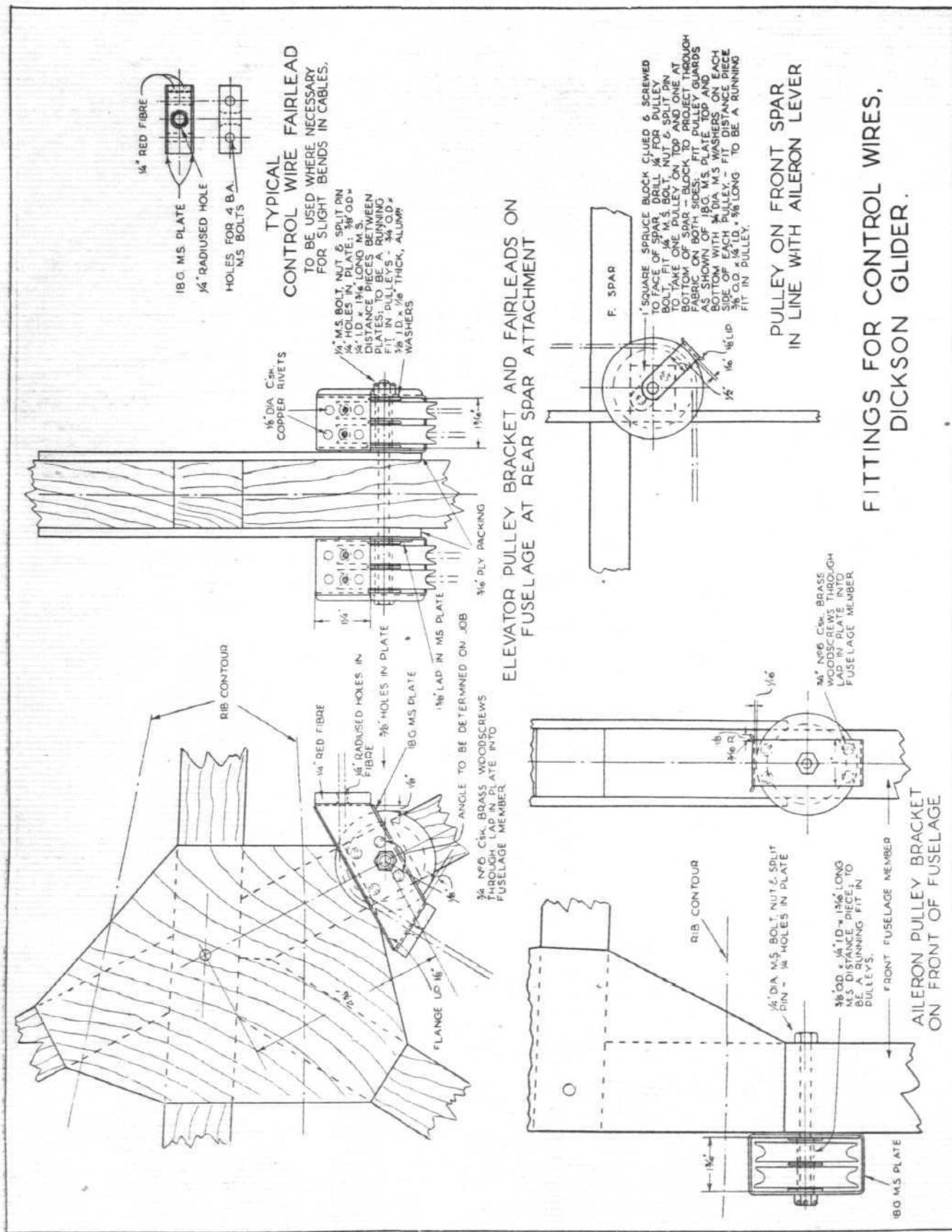
**SPECTATORS, PARTICIPATORS, ADJUDICATORS:** Above is a portion of the crowd who watched Miss Brown (left) get second place in the race. On the right are Mr. Jeffs, whose gloved fist deterred would-be dangerous flyers; Mr. G. Boyes, of N.F.S., and Capt. Worrall, the club's instructor, who ran the show. (FLIGHT Photos.)



**THE VICTORS:** Lt. Bentley and Mr. Thompson receiving their prizes from Lord Brotherton. (FLIGHT Photos.)

Blackburn "Dart" (two-seater) torpedo plane came over from Brough with the "Bluebird" contingent, and its roaring "Lion" was hearty music after the fragile notes of smaller fry.

Our lady pilots were in force: Lady Bailey, Miss Spooner, Miss Brown and Miss Leathart. Miss Spooner disappointed her numerous fans in abstaining from the serious race, giving the valid excuse that her engine had just been overhauled, and she wants to preserve it for future events. By the way, there have been recent changes at Hull. F./O. Mackenzie has succeeded F./O. Ayre who has been drafted back to Hanworth. There were at least fifty aircraft present to spread a profusion of colour below an ominous grey and leaden sky, and the enclosures held some thousands of spectators.



FITTINGS FOR CONTROL WIRES,  
DICKSON GLIDER.

This week we give a further series of control wire fittings for the Dickinson Glider, and next week we shall publish a general arrangement of the control wires. We hope to make arrangements to issue complete sets of blue prints of the drawings of this glider and should be glad to hear from anyone who is interested.

**THE NORFOLK AND NORWICH AERO CLUB.**—The total flying time for April, 1930, was 53 hrs. 5 mins. The weather during April was so fickle that progress was slow, and although several pupils were ready to be sent solo the weather held them up. The Monthly Flying and Landing Competitions for the Alexander Duckham Challenge Cups had to be abandoned on two occasions and finally postponed until May 17. On Saturday, May 24, the Club is holding an Aerial Cross Country Observation Competition, which is open to Licensed Pilot members of Light Aeroplane Clubs. Entrance fee is 3s. 6d., which includes day membership of the Club. In the evening a supper dance will take place in the Club House. Competitors will receive a map on which are marked six circles. The circles enclose a landmark which the competitor has to locate and describe and to drop a message

bag near the landmark as near the zero hour for each mark as possible. The zero hour will be arrived at by dividing the time allowed for the complete course at a speed of sixty miles per hour. Members of the Norwich Club and "B" Licence pilots will be handicapped. Points will be awarded on the greatest number of accurately described landmarks, observation and description of two more ground signs which will be seen *en route* to each landmark if the direct course is taken and for dropping the message bag at zero hour. Flying below 300 ft. will not be permitted. An observer and time-keeper will be stationed at each point on the course. The first prize will be a cup, second prize a tankard inscribed with the Club crest, and a special prize has been put up by Mr. J. Rossi, of Norwich, for the member of the Norwich Club with the best performance. Entries close on Tuesday, May 20.





# AIR TRANSPORT

## THE NEW DAKAR-NATAL AIR SERVICE

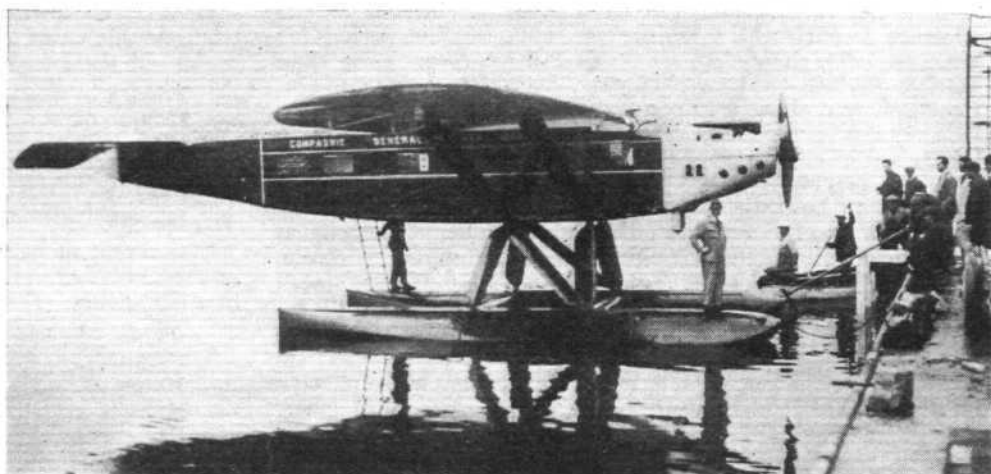
**Aéropostale Co. Establish  
All-Air France—  
S. America Route**

It will be remembered that in his recent lecture before the R.Ae.S., M. P. Grimault stated that Cie. Générale Aéropostale intended to operate the section of the France-South America air service between Dakar and Brazil—which up to now has been carried out by a fleet of fast boats—with aircraft. As briefly recorded in our last issue, M. Mermoz, chief pilot of the Aéropostale Co., left Marseilles for Natal on May 1 in the first of the seaplanes which have been produced for this particular transatlantic section of the route, and this week we are able to give some particulars and illustrations of this machine.

The machine in question is a special "Laté 28-3" monoplane constructed by the Société Industrielle d'Aviation Latécoère, of Toulouse. It is a single-engined monoplane of metal construction fitted with a 600 h.p. Hispano-Suiza engine with reduction gear. The fuselage, constructed of duralumin with light sheet covering of the same material, has two cabins, each 11 ft. in length, 4 ft. 4 in. high, and 5 ft. 6 in. high. One of these cabins is used for the wireless equipment and wireless operator, and the other for the mails. The pilot's station is located high up at the leading edge of the wings.

The wings, of metal construction, fabric-covered, are rigidly braced to the fuselage by two pairs of streamlined struts. The floats, of which there are two, are also constructed of duralumin. Each of them is divided into 10 separate water-tight compartments, so constructed that a leak in one will not affect the others. These floats are 26 ft. 4 in. long, 4 ft. 5 in. wide, and 2 ft. 9 in. deep.

The main dimensions of the "Laté 28-3" are: span,



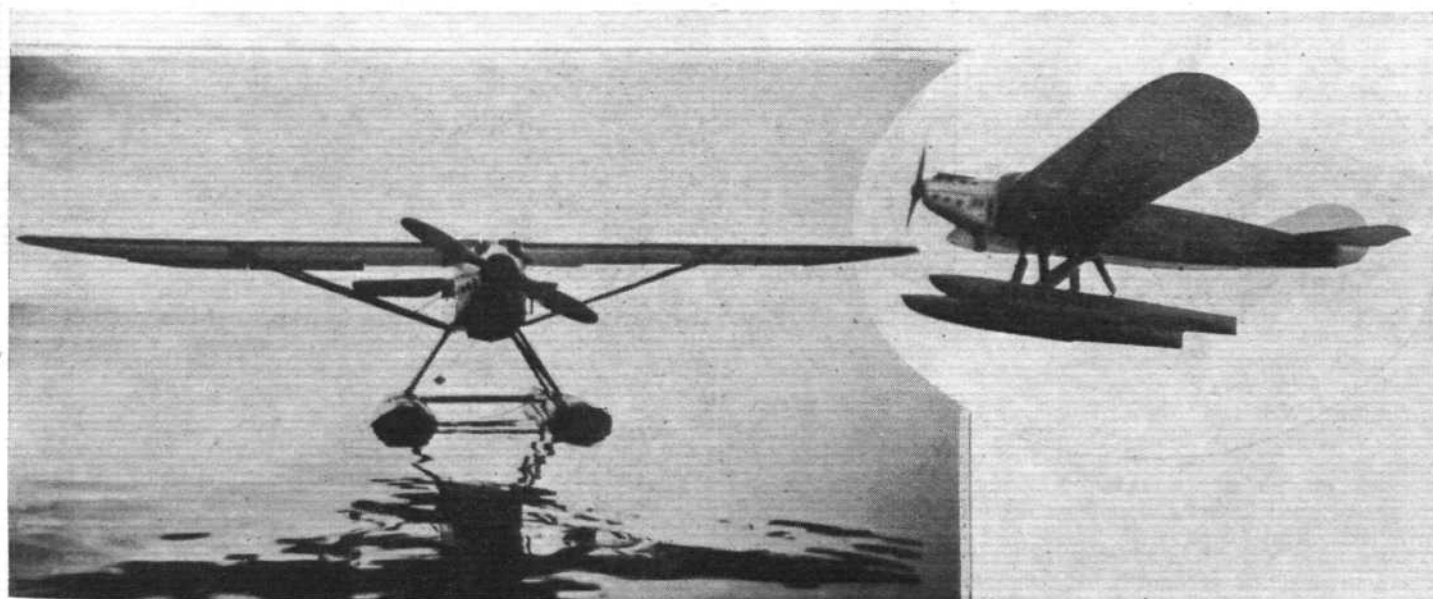
**The "Laté 28-3" seaplane which will be used on the South Atlantic section of the France-South America air service. Below, front and flying views of this machine.**

62 ft. 6 in.; overall length, 44 ft. 4 in.; wing area, 625 sq. ft. The weight empty is 5,720 lb., and fully loaded, 11,044 lb. It is provided with fuel tanks having a total capacity of 556 galls., which will furnish a flight radius of about 20 hours at a cruising speed of 132 m.p.h., or 2,500 miles. The South Atlantic crossing, which this machine has to undertake, is only 1,900 miles, so there will be plenty of fuel in hand.

Recent trial tests have shown that this machine has a ceiling of 13,000 ft., while its climb of 7.5 ft. per second is much superior to that of transport planes used for ordinary service on the air lines. Equipped as above, the "Laté 28-3" has a maximum ground speed of 140 m.p.h.

On March 5 last this machine established two new world speed records for seaplanes: carrying a load of 4,500 lb., it flew over a course of 62.5 miles and 312.5 miles at a speed of 137.5 m.p.h. and 125 m.p.h. respectively. The previous records for these distances, established by the German pilot Wagner on a Dornier Super Wal, were 130 m.p.h. and 107.5 m.p.h. respectively.

It is expected that this "Laté 28-3" seaplane will make the south Atlantic crossing in about 15 to 18 hours. A saving of three days will thus be effected, and the time of seven



days now required to make the trip from Toulouse to Buenos Aires will be reduced to about four days.

As regards M. Mermoz's inaugurating flight, as previously stated, he left Marseilles on May 1, accompanied by M. Daurat (a director of Aéropostale), M. Dabry (navigator), M. Gimie

(wireless operator), and M. Cubant (mechanic). They landed about nine hours later at Kenitra, and left again on May 3, arriving at St. Louis after a brief halt at Port Etienne. He left St. Louis at noon, May 13, and reached Natal the following morning.

## SIX YEARS' COMMERCIAL FLYING IN AUSTRALIA

THE rapid growth of the Australian "air-mind" is shown by statistics of the annual air-traffic in the Commonwealth, compiled from figures kept by the Commonwealth Statistician and the Civil Aviation branch of the Defence Department. The figures, covering the period for 1922 to 1929, show that air traffic last year was more than double that in the previous year, in which year, in turn, traffic showed about a 40 per cent. increase on that of 1927.

The first Australian services commenced operations in 1921, and in all phases of traffic, subsidised and unsubsidised services, private hire and joy-riding, during the first year's operations (the statistical year being 1922), flights numbered 3,050; hours, 1,719; miles, 127,476; number of passengers carried, 2,367; weight of freight, 4,478 lb.; number of letters, 78,542. These totals in 1923 advanced to 3,874 flights in 3,236 hours, over 239,763 miles. Passengers numbered 2,439, freight weighed 11,861 lb., and the number of letters carried 140,214. The great increase in freight and letters was occasioned by the popularity of the newly-opened North-West service. During the succeeding three years steady progress was maintained, as shown in the following table:—

	1924	1925	1926
Flights ..	4,611	5,609	8,174
Hours ..	4,615	5,964	7,672
Miles ..	345,416	451,154	581,974
Passengers ..	3,667	4,323	6,898
Freight (lb.)	8,498	29,103	88,926
Letters ..	204,472	259,505	287,647

In the following year, 1927, a tremendous increase is to be seen. The number of flights was more than four times that of the previous year, and the number of passengers carried

more than five times greater, while great increases were noticed in all other totals. The same progress was made in 1928. But in 1929 traffic not only set record figures, but also showed a record increase, the totals in nearly every phase being double those of 1928. The figures were:—

	1927	1928	*1929
Flights ..	34,647	75,484	146,755
Hours ..	12,910	20,454	47,593
Miles ..	944,644	1,491,551	3,410,078
Passengers	24,486	43,755	102,620
Freight (lb.)	134,205	144,955	224,679
Letters ..	301,971	308,883	391,298

The extent of private and unsubsidised commercial flying in 1929 is shown in the following table, which shows (a) traffic in all branches, (b) subsidised traffic only.

	(a)	(b)
Flights ..	146,755	4,709
Hours ..	47,593	8,126
Miles ..	3,410,078	685,247
Passengers	102,620	7,821
Freight (lb.)	224,679	211,661

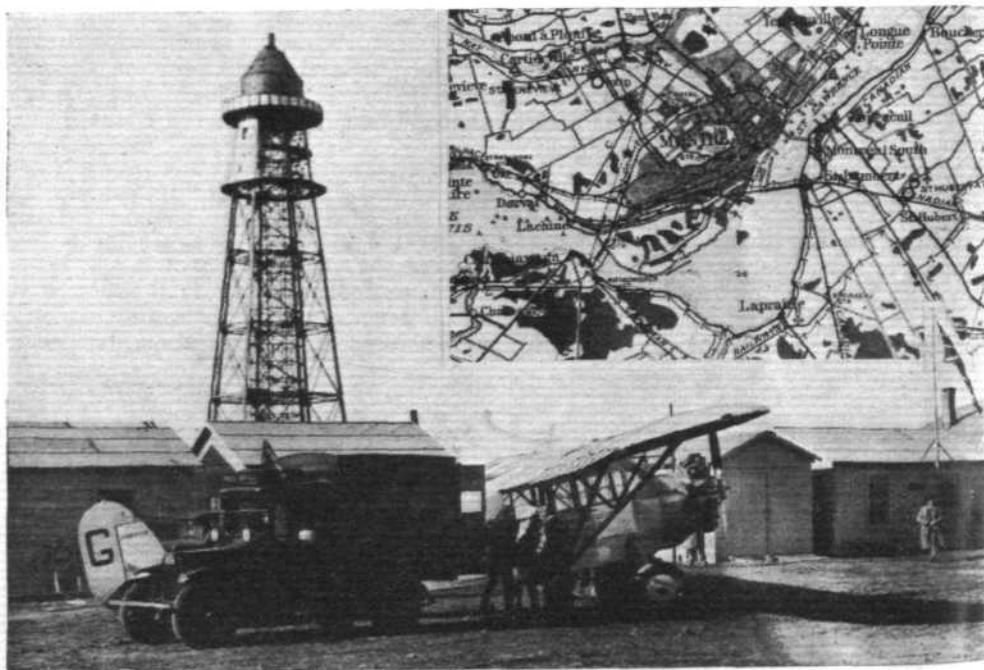
Other figures show that at December 31, 1929 (West Australian figures are shown in brackets) there were 211 (20) registered aircraft; 119 (6) aircraft owners; 213 (14) licensed ground engineers; 271 (19) licensed private pilots; 157 (11) commercial; 59 (15) Government aerodromes; 118 (34) Government emergency landing grounds; 28 (11) licensed aerodromes.

\* Estimated Government Statisticians' figures for the second half of 1929 are not available. Letters do not include 27,003 lb. of mail carried on the Perth-Adelaide route.

## THE R 100 AND THE FLIGHT TO CANADA

IT is hoped, provided that the weather is propitious, to move the airship R 100 from her shed to the tower at Cardington during the present week-end. The damaged elevator has now been repaired. The fin to which it was attached was found not to have suffered at all from the accident when the elevator came in contact with the shed. It is the intention that the airship shall make one more test flight of a few hours in this country. Then, if all goes well, she will start on her great trip across the Atlantic as soon as may be. She should certainly be at Montreal before the end of the present month. Two watches of the crew will be on board during the flight out. The third watch is leaving by steamer for Canada this week-end.

Meantime great excitement is reported from Canada over the coming visit of the British Airship. The tower at St. Hubert Field, outside Montreal, is quite ready for R 100 to moor. This tower is a slightly improved replica of the tower at Cardington, but is 5 ft. higher, and is designed to receive even larger and heavier airships than the R 100 and R 101. The tower head, which was made in England, will withstand a pull of 90,000 lbs.; whereas in the gale at Cardington last autumn R 101 only exerted a pull of 33,600 lb. The gas plant can supply up to 60,000 cub. ft. of hydrogen per hour. Reception committees have been formed to enter-



St. Hubert Field, the aerodrome and airship station of Montreal, showing the mooring tower. (Photo by Can. Nat. Rlys.).

tain the crew of R 100, and huge crowds are expected to visit St. Hubert to see the airship. Traffic arrangements on the roads between Montreal and St. Hubert (which lie 10 miles apart with the St. Lawrence river in between) are receiving careful consideration. It is estimated that a crowd of 300,000 persons will be present to see the arrival of R 100. The roads will be patrolled by mounted police and cavalry. Of course, there is a railway out from Montreal, but additional road approaches to St. Hubert field are also being prepared.



# THE ROYAL AIR FORCE

London Gazette, May 6, 1930.

## General Duties Branch

Flight-Lieut. J. N. D. Anderson (Lieut., R.A., R.A.R.O.) is granted a permanent commn. in this rank (May 1). The follg. Pilot Officers are promoted to rank of Flying Officer:—G. R. Montgomery (February 24); R. J. T. Barrett, J. Cherrill, J. O. H. Lobleby, P. B. Rogers, J. R. Stebbing, A. N. I. Worger-Slade (April 12).

The follg. cease to be attached to R.A.F. on return to Naval duty:—Lieut., R.N., Flight-Lieut., R.A.F.—R. A. Peyton (April 15). Lieuts., R.N., Flying Officers, R.A.F.—A. N. R. Keene (April 14); W. S. Lea (April 15).

Lieut. R. C. Giles, R.M., Flying Officer, R.A.F., ceases to be attached to R.A.F. on return to duty with Royal Marines (April 21); Pilot Officer on Probation G. D. W. Frayling relinquishes his short service commn. on account of ill-health (April 19). The short service commns. of the follg. Pilot Officers on Probation are terminated on cessation of duty:—M. H. Ballantyne (April 30); S. H. Turner (May 7). Sub-Lieut. C. D'O. Umfreville, R.N., Flying Officer, R.A.F., relinquishes his temp. commn. on resigning his commn. in Royal Navy (April 17).

## Stores Branch

Flying Officer R. H. Clay is transferred to Reserve, Class B (May 1).

## Medical Branch

The follg. Flying Officers are promoted to rank of Flight Lieut.:—R. E. Alderson, M.B., B.S. (May 1); A. R. French, M.R.C.S., L.R.C.P., J. H. Cullinan, M.R.C.S., L.R.C.P., P. J. Nyhan, M.B., B.Ch. (May 2). Flight-Lieut. W. Heron, M.B., B.Ch., is transferred to Reserve, Class D ii (May 7).

## Chaplains' Branch

The Rev. A. R. A. Watson is granted a short service commn. as Chaplain (Church of England) with relative rank of Sqdn.-Ldr. (May 1); the Rev. R. H. Horton resigns his short-service commn. (May 1).

## RESERVE OF AIR FORCE OFFICERS

### General Duties Branch

The follg. are granted commns. in Class A.A. (ii) as Pilot Officers on probation:—H. E. Reekie (April 9); J. H. Thompson (April 23). The follg. officers are transferred from Class A to Class C:—Flight-Lieut. C. V. Lock (May 4); Flight-Lieut. O. J. F. Jones-Lloyd (July 4, 1929); Flying Officer J. G. Hay (April 15).

The follg. Flying Officers relinquish their commns. on completion of service:—W. A. R. Speight (May 5, 1929); T. N. Stack, A.F.C. (September 21, 1929); S. G. Williams (December 9, 1929); A. B. Cree (March 29); G. F. Blackburn (April 23). The follg. Flying Officers relinquish their commns. on completion of service, and are permitted to retain their rank:—A. L. Pearce (April 15); K. R. Thomas (April 28).

## AUXILIARY AIR FORCE

### General Duties Branch

No. 602 (CITY OF GLASGOW) (BOMBER) SQUADRON.—The follg. Pilot Officer to be Flying Officer:—J. S. Feather (January 10). No. 605 (COUNTY OF WARWICK) (BOMBER) SQUADRON.—Pilot-Officer S. J. Huins relinquishes his commn. on account of ill-health and is permitted to retain his rank (April 7).

## ROYAL AIR FORCE INTELLIGENCE

**Appointments.**—The following appointments in the Royal Air Force are notified:—

### General Duties Branch

**Wing Commanders:** C. F. A. Portal, D.S.O., M.C., to H.Q., Coastal Area, Supernumerary, on completion of special duty in India, 18.4.30. T. G. Hetherington, C.B.E., to R.A.F. Depot, Uxbridge, on relinquishing appointment as Air Attaché, Washington, 1.4.30.

**Squadron-Leaders:** A. S. Maskell, to R.A.F. Base, Calshot, 24.4.30. V. S. E. Lindop, to H.Q., R.A.F., Transjordan and Palestine, 15.4.30. H. G. R. Malet, to No. 2 Armoured Car Co., Palestine, 13.4.30. S. B. Harris, D.F.C., A.F.C., to No. 39 Sqdn., India, 4.4.30. H. Leedham, to Special Duty List, 22.4.30. T. H. Newton, D.S.C., to R.A.F. M.T. Depot, Shrewsbury, 25.4.30.

**Flight-Lieutenants:** W. F. Dickson, D.S.O., A.F.C., to H.Q., R.A.F. India, 4.4.30. J. Cottle, M.B.E., D.F.C., to No. 2 Armoured Car Co., Palestine, 12.4.30. G. P. H. Carter, to H.Q., R.A.F., Middle East, 14.4.30. J. Glover, to R.A.F. Depot, Egypt, 16.4.30. J. E. G.-H. Thomas, to No. 1 (Indian Wing) Station, India, 5.4.30. L. R. W. Tillard, to No. 3 (Indian Wing) H.Q., 5.4.30. J. W. Turton Jones, to No. 3 Sqdn., Upavon, 25.3.30. M. S. Keogh, A.M., to R.A.F. Depot, Uxbridge, 25.3.30. B. Cheesman, M.B.E., to R.A.F. Depot, Uxbridge, 2.3.30. A. J. E. Broomfield, D.F.C., to Armament and Gunnery School, Eastchurch, 18.4.30. E. C. Barlow, to No. 1 Flying Training School, Netheravon, 21.4.30. T. J. Desmond, to Station H.Q., Upper Heyford, 28.4.30. D. V. Carnegie, A.F.C., to R.A.F. Depot, Uxbridge, 2.3.30. H. G. W. Lock, D.F.C., to No. 12 Sqdn., Andover, 8.4.30. R. Ivelaw-Chapman, D.F.C., A.F.C., to No. 56 Sqdn., North Weald, 8.4.30. S. J. Smetham, to No. 33 Sqdn., Eastchurch, 1.4.30. H. J. Adkins, to R.A.F. Depot, Uxbridge, 10.4.30. G. N. J. Stanley-Turner, to R.A.F. Depot, Uxbridge, 10.4.30.

**Flying Officers:** H. L. Drake, to R.A.F. College, Cranwell, 23.4.30. B. W. Knox, to Armament and Gunnery Sch., Eastchurch, 25.4.30. C. S. Ellison, to Station H.Q., Duxford, 28.4.30. P. Coyle, to R.A.F. Depot, Uxbridge, 25.3.30. F. G. Fairhead, to Sch. of Naval Co-operation, Lee-on-Solent, 10.4.30. J. S. Bromfield, J. E. Allen and J. J. Owen, to No. 1 Flying Training Sch., Netheravon, 22.4.30. H. Bailey and V. S. Bowling, to No. 2 Flying Training School, Digby, 22.4.30. D. Dickson, J. E. Markby and A. E. Dark, to No. 3 Flying Training School, Grantham, 22.4.30. C. K. J.

Coggle, K. F. T. Pickles, S. R. Groom and N. E. White, to No. 5 Flying Training Sch., Sealand, 22.4.30. H. G. Hicks and J. H. T. Simpson, to R.A.F. Training Base, Leuchars, 22.4.30. J. A. H. Loudon, to R.A.F. College, Cranwell, 23.4.30. G. J. Ross, to R.A.F. Depot, Uxbridge, 10.4.30. C. A. C. Patton, to R.A.F. Depot, Uxbridge, 10.4.30. C. Stephenson, to No. 6 Sqdn., Middle East, 26.4.30. R. K. Hamblin, to Elec. and Wireless Sch., Cranwell, 28.4.30.

**Pilot Officers:** E. C. Hudleston, to R.A.F. College, Cranwell, 22.4.30. D. P. Lascelles and R. W. Letchworth, to No. 5 Flying Training Sch., Sealand, 22.4.30.

The undermentioned Pilot Officers are all posted to No. 3 Flying Training Sch., Grantham, with effect from 26.4.30:—J. W. P. Armitage, G. V. Barber, R. J. W. Barnett, C. F. Birks, G. A. Bolland, J. A. S. Brown, L. A. Bullard, R. G. E. Catt, R. N. Clarke, L. J. Crosbie, K. B. B. Cross, E. Dawson, A. E. Dobell, G. F. K. Donaldson, R. B. Harrison, H. O. Haughton, P. Haynes, E. J. N. Heaven, G. H. Leftwich, D. L. McAllister, D. W. Morrish, J. G. B. O'Hagan, A. E. B. Trappes-Lomax, L. J. M. White, and G. W. Williams.

### Stores Branch

**Squadron-Leader** P. M. Brambleby, to R.A.F. Depot, Uxbridge, 1.4.30. **Flying Officer** N. W. Law, to R.A.F. Depot, Uxbridge, 1.4.30.

### Accountant Branch

**Flight-Lieutenants:** R. G. Dyer, to R.A.F. Depot, Uxbridge, 8.4.30. F. O. Hall and E. V. Humphrey, to R.A.F. Depot, Uxbridge, 10.4.30. **Flying Officer** G. H. White, to H.Q., Iraq Command, 26.4.30.

## NAVAL APPOINTMENTS

The following appointments have been made by the Admiralty:—

**Lieutenants** J. A. L. Drummond and C. K. Ashwanden, attached to R.A.F. (May 11).

**Lieutenant (Flight-Lieut., R.A.F.)** A. P. Colthurst, to *Furious* (April 15). **Lieutenants (Flying Officers, R.A.F.)** J. Brett, D. J. Margetts, J. B. Buckley, C. W. Phillips, and H. N. M. Nangle, to *Furious* (April 15).

**Sub-Lieutenant (Flying Officer, R.A.F.)** I. C. Rowe, to *Furious* (April 15). **Sub-Lieutenants** T. W. T. Blackwell, G. B. Kingdon, G. D. Anderson, J. de F. Jago, W. G. Williams, and W. H. G. Saunt, attached to R.A.F. (May 11).

## CIVIL AVIATION SUBSIDIES

ON Tuesday, May 13, Mr. Montague, Under-Secretary for Air, in the House of Commons, moved the second reading of the Air Transport (Subsidy Agreements) Bill.

Sir Samuel Hoare asked whether the Government contemplated subsidising a service to South Africa, taking in the West African Dependencies, and an air line across the southern Atlantic to South America. Regarding airships, he said that he, when at the Air Ministry, had contemplated creating an Empire Airship Transport Company, and he asked if that was still the general policy of the Air Ministry. He also suggested a mail service with aeroplanes travelling at not less than 150 m.p.h., and the development of very large flying boats.

Mr. Baillie Hamilton thought that money should be spent on popularising British aircraft abroad.

Admiral Sueter urged that Malta should be made a first-class air base, and that enquiries should be made as to helium supplies in Canada.

Mr. Montague, in reply, said that the Bill did not provide money for civil flying, but only empowered the Air Council to make long-term agreements. Therefore some of the remarks made had been wide of the mark. The next stage in airship development must be one of experiment.

Sir Philip Sassoon urged rapid mail services to India and South America, flying at 150 m.p.h. or more.

The Bill was read a second time, and committed to a Committee of the whole House.

## R.A.F. Dinner Club

THE 8th Annual Dinner of the R.A.F. Dinner Club will be held at 8 p.m. on Friday, June 27, at the Connaught Rooms. Membership of the club is open to all serving R.A.F.

officers and past officers of the R.A.F., R.F.C., or R.N.A.S. The Honorary Secretary is Sqdn.-Ldr. J. O. Andrews, Air Staff, Air Ministry, Kingsway, W.C.2, from whom forms of application for membership can be obtained.

# THE AIR LEAGUE COMES OF AGE

(Concluded from page 532.)

The position of England was, he said, pathetic. As an example he compared the subsidies of France, Germany and England, both the former were spending some £3,000,000 on civil aviation, while we were allocating a paltry £420,000 for this purpose. The position was contemptible for such a nation as ourselves, as, while we found money for such misguided purposes as the dole, we did nothing for the thing the country needed most of all. In conclusion, he concurred with the policy for the Air League, which had been suggested by the previous speakers.

MAJOR SEELY, in reply, said that he was the first minister to fly, and considered himself one of the aborigines of aviation. In a witty and amusing speech he recalled the early days, and said that Freddie Guest had done as much as anyone for aviation, but that much was only limited by what Lloyd George had allowed him to do while in office. He made an appeal for continued support for the Air League, and hoped that it would prosper. It was largely the women of England, he said, who would make aviation go, and they had taken it up with all the will in the world. As an example he pointed to the fact that there were eight girls on the recently-arranged tour which went from Heston around Europe. This he felt was a most hopeful sign. He felt that the Air League had done a very great deal for Aviation, and hoped that they would continue and make England the leading air power in the world.

THE MASTER OF SEMPILL, in proposing the toast of "The Chairman," said that this was really the most important toast of the evening, as without such a chairman as they had here to-night nothing much could be expected from the League. Sir Alan, he said, was a very big figure in finance and shipping, and they were, he felt sure, greatly honoured to have him as their Chairman. Col. Sempill then went on to extol the recent flight of Capt. Barnard and Mr. R. Little, which had been made possible by the Duchess of Bedford, who had also taken more than her share of the dangers and work which such a flight had entailed.

SIR ALAN ANDERSON, in reply, thanked Col. Sempill for his kind words, and went on to say that the future of the Empire depended upon communications, and it was the air that was going to provide these communications, while the Air League was going to do its bit to see that this came about.

After this the dinner party broke up and a very enjoyable dance ensued.

Well over 200 guests were present with many well-known and important people, amongst whom were:—

Sir Alan Anderson, K.B.E.; The Duchess of Bedford, D.B.E., R.R.C.; Rt. Hon. Sir Samuel Hoare, P.C., G.B.E., C.M.G., M.P.; Lady Cobham; Col. the Master of Sempill, A.F.C., F.R.A.S.; Lady Maud Hoare; Capt. Barnard; The Hon. Lady Shelley-Rolls; Capt. the Rt. Hon. F. E. Guest, P.C., C.B.E., D.S.O.; The Hon. Mrs. Forbes-Sempill; Capt. Sir John Shelley-Rolls, Bt., J.P., D.L.; Miss Diana Guest; Sir Alan Cobham, K.B.E., A.F.C.; Mrs. Barnard; Dr. Merton, M.C., M.A.; Mrs. Merton; The Hon. Lady Bailey, D.B.E.; P. J. H. Hannon, M.P., F.R.G.S., F.S.S.; Miss Gordon Barratt; Gen. Sir Reginald Wingate, Bt., G.C.B., G.C.V.O., K.C.M.G., D.S.O.; Miss Hannon; Col. Moore Brabazon, M.C.; The Lady Maud Warrender; Lieut.-Com. the Hon. J. M. Kenworthy, M.P.; Lady Wingate, D.B.E.; Sir Charles Bright, F.R.S.E., M.I.C.E.; Mrs. Whitridge; Sir Harry Brittain, K.B.E., C.M.G.; Mrs. Thwaites; Col. Ivan Davson, O.B.E., T.D.; Mrs. Manson Smith; Mrs. Spencer Cleaver; Gen. the Hon. J. E. Seely, P.C., C.B., C.M.G., D.S.O.; The Rt. Hon. Viscountess Elibank; Sir Sefton Branker, K.C.B., A.F.C.; Air Commodore J. G. Weir, C.M.G., C.B.E.; Miss Auriol Lee; Major the Rt. Hon. Sir Henry Norman, Bt., P.C., J.P.; Mrs. Weir; Capt. H. H. Balfour, M.C., M.P.; Count von Bernstorff; Kathleen, Countess of Drogheda; Sir Francis Newton, K.C.M.G., C.V.O.; Vice-Admiral Wade Caulfield; The Dowager Lady Swaythling; The Rt. Hon. Sir Leslie Wilson, P.C., G.S.I., C.M.G., D.S.O.; Lady Wilson; The Earl of Cardigan; Countess of Cardigan; Lt.-Col. N. G. Thwaites, C.B.E., M.V.O., M.C.; Miss Spooner; Oswald Short, Esq.; Mrs. Sippe; Mrs. H. Blackburn; Major Sippe; Francis Short, Esq.; Robert Blackburn, Esq.; Col. Fell, O.B.E., D.S.O.; Mrs. Fell; Major J. C. Buchanan, O.B.E.; Mrs. Buchanan; Norman Holden, Esq.; Sir Charles Delme Radcliffe, K.C.M.G., C.B., C.V.O.; Lady Helena Acland Hood; Commander H. Perrin; Mrs. Perrin; Air Commodore Chamier, C.B., C.M.G., D.S.O., O.B.E.; Mrs. Chamier; Group Capt. Courtney; Mrs. Courtney; Capt. Acland; Mrs. Acland; F. Handley Page, Esq., C.B.E.; Mrs. F. Handley Page.

## The Antwerp Exhibition

A CEREMONIAL inauguration of the British Government Pavilion, opened on May 5, at the International Exhibition at Antwerp, will be held on May 20, when the British Ambassador, the Right. Hon. Earl Granville, will be present. A "British Week" will also be held at the Exhibition from July 17 to 23. In addition to the aeronautical exhibits mentioned in last week's issue, we understand that one of the 900-h.p. Napier racing engines, which was fitted to the Supermarine S.5 seaplane which brought back to England the Schneider Trophy in 1927, will be on show.

## The Royal Tournament

THE Royal Tournament opens at Olympia on Thursday, May 29, and runs until Saturday, June 14. The programme

shows that the performance should be quite as attractive as in former years. The R.N. and R.M. provide the Inter-Port Field Gun display and a rope-climbing display. The Army, as usual, provides most of the items, namely, a musical ride by the 3rd Carabiniers, a musical drive by "J" Battery, R.H.A., a mounted display by the Equitation School, a gymnastic display and fencing display by the Army P.T. staff, a historical display by the 2nd Royal Fusiliers, trick riding by the 17/21st Lancers, piping by the Scots Guards, and a combined display by R.E., R.A., Infantry, etc. The Royal Air Force contributes one item, a display of physical training by recruits of the R.A.F. Depot, whose service averages three months. In former years, this display has always been one of the most attractive items in the programme, and no doubt it will this year attain the same high standard.

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## IMPORTS AND EXPORTS

AEROPLANES, airships, balloons and parts thereof (not shown separately before 1910).

For 1910 and 1911 figures see FLIGHT for January 25, 1912.

For 1912 and 1913, see FLIGHT for January 17, 1914.

For 1914, see FLIGHT for January 15, 1915, and so on yearly, the figures for 1927 being given in FLIGHT, January 17, 1930.

	Imports.		Exports.		Re-exports.	
	1929.	1930.	1929.	1930.	1929.	1930.
	£	£	£	£	£	£
Jan. ..	—	2	74,307	147,935	100	—
Feb. ..	6,532	2,460	195,369	226,049	2	1,000
Mar. ..	1,210	744	204,664	156,098	90	802
April ..	5,816	2,959	186,477	213,390	115	79
	16,410	9,150	660,817	743,472	307	1,881

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## PUBLICATIONS RECEIVED

*Aeronautical Research Committee Reports and Memoranda: No. 1268 (Ae. 414).—Experiments Relating to the Flow in the Boundary Layer of an Airship Model. By L. F. G. Simmons, M.A. April, 1928. Price 6d. net. H.M. Stationery Office, London, W.C.2.*

*Department of Scientific and Industrial Research: Second Report of the Fabrics Co-ordinating Research Committee. H.M. Stationery Office, Kingsway, London, W.C.2. Price 5s. net.*

*Equipment Used in Experiments to Solve the Problem of Fog Flying. March, 1930. The Daniel Guggenheim Fund for the Promotion of Aeronautics, Inc., 598, Madison Avenue, New York City, U.S.A.*

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## AERONAUTICAL PATENT SPECIFICATIONS

(Abbreviations: Cyl. = cylinder; i.c. = internal combustion; m. = motors. The numbers in brackets are those under which the Specification will be printed and abridged, etc.)

### APPLIED FOR IN 1929

Published May 15, 1930

- 8,472. C. B. REDRUP. Connecting-rods for radial-cylinder engines (328,089.)  
 15,211. H. JUNKERS. Controlling of aircraft. (312,639.)  
 19,971. R. TUROLA and C. G. FASCETO. Flow-directing cones for screw propellers. (314,549.)

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